245

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L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

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SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 13 IN SET 234

Chassis 1-514-1, -3, -4, -5, -6, 1-520-0, -1, -3, -4, -5, -6, -7, -8

Sylvania chassis 1-514-1, -3, -4, -5, -6 and 1-520-0, -1, -3, -4, -7, -8 are covered in Photofact Folder 13, Set 234. Later production changes and chassis additions are given in this bulletin.

All 1-514 and 1-520 series chassis are basically the same except for picture tubes tuners and HaloLight (*). A chart is given below which shows the differences between the chassis and the models used in each chassis.

CHASSIS	CRT	TUNERS VHF	TUNERS UHF	HALOLIGHT *	MODEL SERIES
1-514-1	17YP4	S.T.		No	105-14, 300
1-514-3	17YP4	G.I.		No	105-14, 300, 306
1-514-4	17YP4	G.I.	G.I.	Yes	105-14"U", 300"U", 306"U"
1-514-5	17JP4	G.I.		Yes	301, 401
1-514-6	17JP4	G.I.	G.I.	Yes	301"U", 401"U"
1-520-0	21EP4A	G.I.		Yes	321-1, 326,
1-520-1	21ZP4	S.T.		No	120-20, 320, 325, 420
1-520-3	21ZP4A	G.I.		No	120-20, 320, 325, 420
1-520-4	21ZP4A	G.I.	G.I.	No	120-20"U", 320"U", 325"U", 420"U"
1-520-5	21ZP4A	G.I.		Yes	321, 421, 425
1-520-6	21ZP4A	G.I.	G.I.	Yes	321"U", 421"U", 425"U"
1-520-7	21EP4A	S.T.		Yes	321-4, 326
1-520-8	21EP4A	G.I.	G.I.	Yes	326"U"

The schematic for the Sarkes Tarzian tuner (S.T.) is given on page 2 in Folder 13, Set 234. The schematics for the General Instrument (G.I.) VHF and UHF tuners are given on page 20.

Production changes in Sylvania television receivers are coded as follows: Chassis start production as C00, the first variation becomes C01, the second C02, etc. This number is indicated by the last two digits in the first series of the numbers in the serial number on the back of the chassis. Since the change code varies for different chassis with each particular change, a chart is given below which shows the change code used in each chassis for a given change.

SYLVANIA MODELS 105-14 Series (Ch.1-514-1, -3), 105-14"U"Series(Ch.1-514-4), 120-20 Series(Ch.1-520-1, -3), 120-20"U" Series (Ch.1-520-4), 300 Series(Ch.1-514-1, -3), 300"U" Series (Ch.1-514-4) 301 Series (Ch.1-514-5), 301"U" Series(Ch.1-514-6) 306 Series (Ch.1-514-3), 306"U" Series(Ch.1-514-4), 320 Series (Ch.1-520-1),320"U" Series (Ch.1-520-4)321Series(Ch.1-520-5), 321"U"Series(Ch.1-520-6), 321-1 Series(Ch.1-520-0, -7), 325 Series(Ch.1-520-1, -3), 325"U"Series (Ch.1-520-4), 326 Series (Ch.1-520-0, -7),326"U"Series (Ch.1-520-8), 401Series (Ch.1-514-5), 401"U"Series (Ch.1-514-6), 410Series(Ch.1-530-1), 410"U"Series(Ch.1-530-2), 420 Series (Ch.1-520-1, -3), 420"U" Series (Ch.1-520-4), 421Series(Ch.1-520-5), 421"U" Series(Ch.1-520-6), 425 Series,(Ch.1-520-5), 425"U" series (Ch.1-520-6).

CHASSIS	1-514-1	1-514-3	1-514-4	1-514-5	1-514-6	1-520-0	1-520-1	1-520-3	1-520-4	1-520-5	1-520-6	1-520-7	1-520-8
Change # 1	C01	C00	C01	C00	C00	C00	C00	C00	C00	C00	C00	C00	C00
Change # 2	C02, C03	C00	C02, C03	C00	C00	C00	C01, C02	C00	C01, C02	C00	C00	C01	C01
Change # 3	C04	C00	C04	C00	C00	—	—	—	—	—	C00	—	—
Change # 4	C04	C00	C04	C00	C00	C00	C03	C00	C03	C00	C00	C02	C02
Change # 5	C05	C01	C05	C00	C00	C01	C04	C00	C04	C00	C00	C03	C03
Change # 6		C01	C05	C00	C00	C01	—	C00	C04	C00	C00	—	C03
Change # 7	C06	C02	C06	C00	C00	C02	C05	C00	C05	C00	C00	C04	C04
Change # 8	C06	C03	C06	C00	C00	C02	C06	C00	C06	C00	C00	C04	C04
Change # 9	—	—	C07	C01	C01	C02	C07	C01	C07	C00	C00	C04	—
Change # 10	—	C05	C07	C02	C02	—	C07	C02	C07	C01	C01	—	—
Change # 11	—	C06	C07	C03	C03	—	C07	—	C07	C02	C02	—	—
Change # 12	—	—	—	—	—	—	—	—	—	—	C03	—	—
Change # 13	—	—	—	C04	C04	—	—	C03	—	C04	C04	—	—

(—) Designates no change from previous issue.

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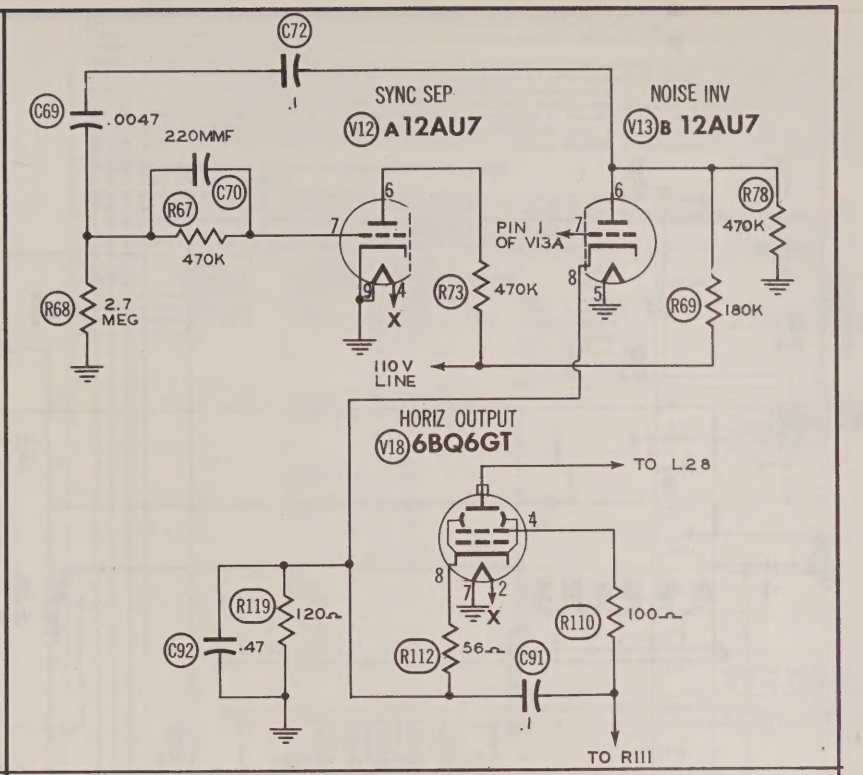
	Changes 1 thru 9 are included in Photofact Folder 13, Set 234, however a list of the changes made for each code is given below for reference purposes.
Change #1	The horizontal oscillator tube and the audio output transformer were relocated.
Change #2	R113 and C93 were added. In earlier production these were omitted.
Change #3	C96 was changed from .0033MFD to .0047MFD in chassis 1-514 series only.
Change #4	C7 (cathode of V18) was removed.
Change #5	TO PREVENT AUDIO INTERFERENCE IN HORIZONTAL OSCILLATOR CIRCUIT C68, which was formerly connected across the audio output transformer (T7) was reconnected to 290 volts. TO IMPROVE VIDEO IF RESPONSE R34 was changed from 1500Ω to 1200Ω.
Change #6	TO PROVIDE ADDITIONAL RF FILTERING FOR TUNER B+ A .0047MFD capacitor was added from the 290 volt lead of the alternate tuner (page 20) to ground. NOTE: A 2.7KΩ resistor should be shown between the 290 volt source and the junction of the 470KΩ and 1.8Meg resistor in the schematic on page 20. This capacitor is then added from the junction of the resistors to ground.
Change #7	TO REDUCE EXCESS HORIZONTAL DRIVE C90 was changed from 1000MMF to 820MMF. TO IMPROVE VIDEO RESPONSE The 12KΩ, 2 watt resistors (R46, R47 and R48) were changed to a new smaller unit (part #189-0038). This substitution reduces the combined inductance of the group, but the resistance and wattage remain the same. VERTICAL HOLD CONTROL CHANGED The vertical hold control (R3) was changed from a 155Meg (part #153-0014) to a 2Meg unit (part #153-0018).
Change #8	TO IMPROVE AUDIO PERFORMANCE C68 was changed from .0047MFD to .015MFD.
Change #9	TO IMPROVE HORIZONTAL STABILITY C69 was changed from .01MFD to .0047MFD. R68 was changed from 1.2Meg to 2.7Meg. R69 was changed from 330KΩ to 180KΩ. R74 and R75 were deleted. R112 was changed from 180Ω to 56Ω. A 120Ω resistor was added from the bottom of R56 to ground. A partial schematic, showing the revised circuit, is given on the next page.
Change #10	TO IMPROVE VIDEO IF SENSITIVITY The two 47Ω cathode resistors (R22 & R27) were changed to resistors having a 5% tolerance. FUSE ADDED A .5 Amp., slow blow, fuse was added in the low voltage power supply between pin 8 of V21 (5U4G) and the junction of C1A and L31. This fuse is physically located near the .25 Amp. fuse (M1) and is accessible from the top of the cabinet.



Change #11

COMPONENT CHANGES

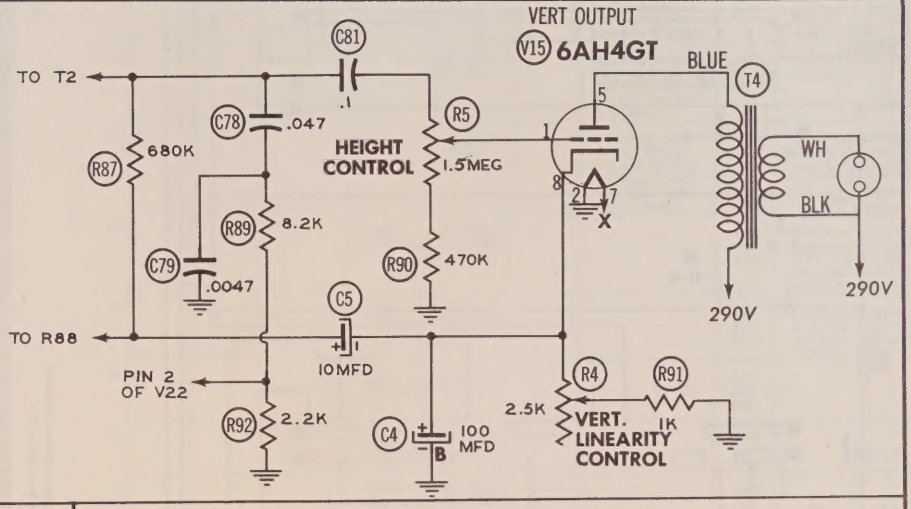
C79 (pin 2, V22) was changed from .0033MFD to .0047MFD.

C80 was omitted.

R89 was changed from 10KΩ to 8.2KΩ, 5%.

R92 was changed from 470KΩ to 2.2KΩ.

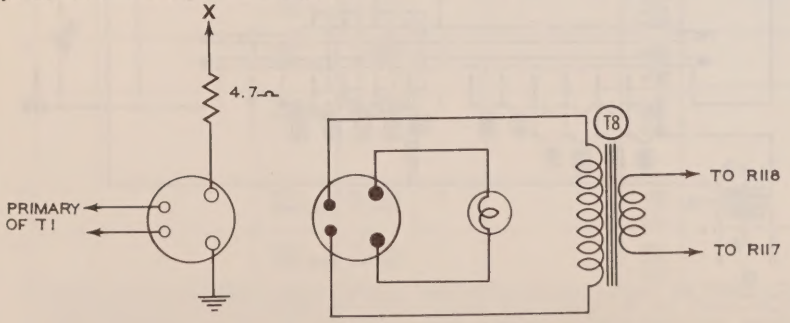
The partial schematic below shows the revised circuit.



Change #12

CHANNEL INDICATOR LIGHT ADDED IN CHASSIS 1-520-6.

A channel indicator light was added for models using Ch. 1-520-6, Code C03 only. A partial schematic showing the circuit is given below.



VHF TUNER ALIGNMENT FOR CHASSIS 1-530-1, 1-530-2

Connect 3 volt bias battery as under video IF alignment. Disconnect the primary winding of L15 from Pin 5 (plate of 6CB6 (V3) and connect a 330Ω resistor from the B+ end of L15 to Pin of V3.
During alignment the use of two marker generators is required. Generator # 1 (IF) is connected through a 2 or 3 MMF capacitor to the input of detector probe (see Fig. 6, Photofact Folder 234-13). Marker generator # 2 (RF) is connected through a 2 or 3 MMF capacitor across the sweep generator at the antenna terminals. If the sweep generator has a built-in marker generator, it should be used for marker generator # 2.
Since it is necessary during the tuner alignment to switch the oscilloscope vertical input between the IF detector circuit (Fig. 1, Photofact Folder 234-13), which is connected to Pin 5 of V3, and the RF detector circuit (Fig. 6, Photofact Folder 234-13), which is connected to alignment point H on tuner, it is recommended that a single pole double throw switch be mounted as closely as possible to the oscilloscope vertical input terminals so the vertical input terminals may be easily switched between the RF and IF detector circuits. All connecting leads should be shielded and kept as short as possible.
Set the fine tuning control so the plates are approximately half meshed.
Remove 6CB6 (V4) from its socket.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

VHF TUNER OSCILLATOR ALIGNMENT

Since channels 2 to 5 and 7 to 12 are aligned by expanding of compressing coil increments, the preceeding aligned increments must not be disturbed.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
53.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC (RF marker) 45.75MC (IF marker)	13	Vert. Amp. thru detector (Fig. 6 PFF 234-13) to IF marker gen. and point (H). Low side to chassis.	A92	Adjust so that RF and IF markers coincide as in Fig. 8(PFF234-13).
54.	"	"	207MC (10MC Swp)	205.25MC 45.75MC	12	"	A93	Expand or compress coil until markers coincide as in Fig. 8(PFF234-13). Curves may not be symmetrical until RF alignment is complete.
55.	"	"	201MC (10MC Swp)	199.25MC 45.75MC	11	"	A94	"
56.	"	"	195MC (10MC Swp)	193.25MC 45.75MC	10	"	A95	"
57.	"	"	189MC (10MC Swp)	187.25MC 45.75MC	9	"	A96	"
58.	"	"	183MC (10MC Swp)	181.25MC 45.75MC	8	"	A97	"
59.	"	"	177MC (10MC Swp)	175.25MC 45.75MC	7	"	A98	"
60.	"	"	85MC (10MC Swp)	83.25MC 45.75MC	6	"	A99	Adjust so that RF and IF markers coincide as in Fig. 8(PFF234-13).
61.	"	"	79MC (10MC Swp)	77.25MC 45.75MC	5	"	A100	Compress or expand coils until markers coincide as in Fig. 8(PFF234-13).
62.	"	"	69MC (10MC Swp)	67.25MC 45.75MC	4	"	A101	"
63.	"	"	63MC (10MC Swp)	61.25MC 45.75MC	3	"	A102	"
64.	"	"	57MC (10MCSwp)	55.25MC 45.75MC	2	"	A103	"

VHF TUNER RF ALIGNMENT

Care must be exercised not to disturb the preceeding aligned coil increments.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
65.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru detector (Fig. 6 PFF 234-13) to IF marker gen. and point (H). Low side to chassis.	A104 A105 A106	Adjust A104 for maximum mid-band height regardless of skirts. Adjust A105 for proper skirt contour. Adjust A106 for flat topped response. See Fig. 9 (PFF 234-13). Video carrier must be 100%. Sound carrier may be as low as 70%.
66.	"	"	"	45.75MC 42.1MC	"	Vert. Amp. thru detector (Fig. 1 PFF 234-13) to pin 5 of V3. Low side to chassis.	A2, A3	Adjust for response curve similar to Fig. 10 (PFF 234-13).
67.	"	"	"	211.25MC 215.75MC	"	Vert. Amp. thru detector (Fig. 6 PFF 234-13) to IF marker gen. and point (H). Low side to chassis.		If necessary, SLIGHTLY retouch A106 for flat top. There must not be more than 5% dip in response curve. See Fig. 11 (PFF 234-13).
68.	"	"	207MC (10MC Swp)	205.25MC 209.75MC	12	"	A107 A108 A109	Compress or expand coils for channel 12 to obtain response similar to Fig. 12 (PFF 234-13). A107 adjusts mid-band amplitude, A108 adjusts skirt frequency, and A109 adjusts for flat topped response.
69.	"	"	201MC (10MC Swp)	199.25MC 203.75MC	11	"	A110 A111 A112	Compress or expand coil for curve similar to Fig. 12 (PFF 234-13). Picture and sound markers must remain on top of curve.
70.	"	"	195MC (10MC Swp)	193.25MC 197.75MC	10	"	A113 A114 A115	"
71.	"	"	189MC (10MC Swp)	187.25MC 191.75MC	9	"	A116 A117 A118	"
72.	"	"	183MC (10MC Swp)	181.25MC 185.75MC	8	"	A119 A120 A121	"
73.	"	"	177MC (10MC Swp)	175.25MC 179.75MC	7	"	A122 A123 A124	"
74.	"	"	85MC (10MC Swp)	83.25MC 87.75MC	6	"	A125 A126 A127	"
75.	"	"	79MC (10MC Swp)	77.25MC 81.75MC	5	"	A128 A129 A130	"
76.	"	"	69MC (10MC Swp)	67.25MC 71.75MC	4	"	A131 A132 A133	"
77.	"	"	63MC (10MC Swp)	61.25MC 65.75MC	3	"	A134 A135 A136	"
78.	"	"	57MC (10MC Swp)	55.25MC 59.75MC	2	"	A137 A138 A139	"
79.	Recheck all channels for flat topped response. If necessary, retouch A105 through A139 in order given. A dip of 30% is permissable for all channels. If the bandwidth of any channel is insufficient after foregoing adjustments, adjust "gimmicks" A140, A141, A142 by bending wires toward or away from the capacitors. Remove 330Ω resistor from plate of V3 to B+. Restore connection to L15. Replace V4 in its socket. Remove test equipment. Continue alignment (UHF tuner) with step 50, (Photofact Folder 234-13).							

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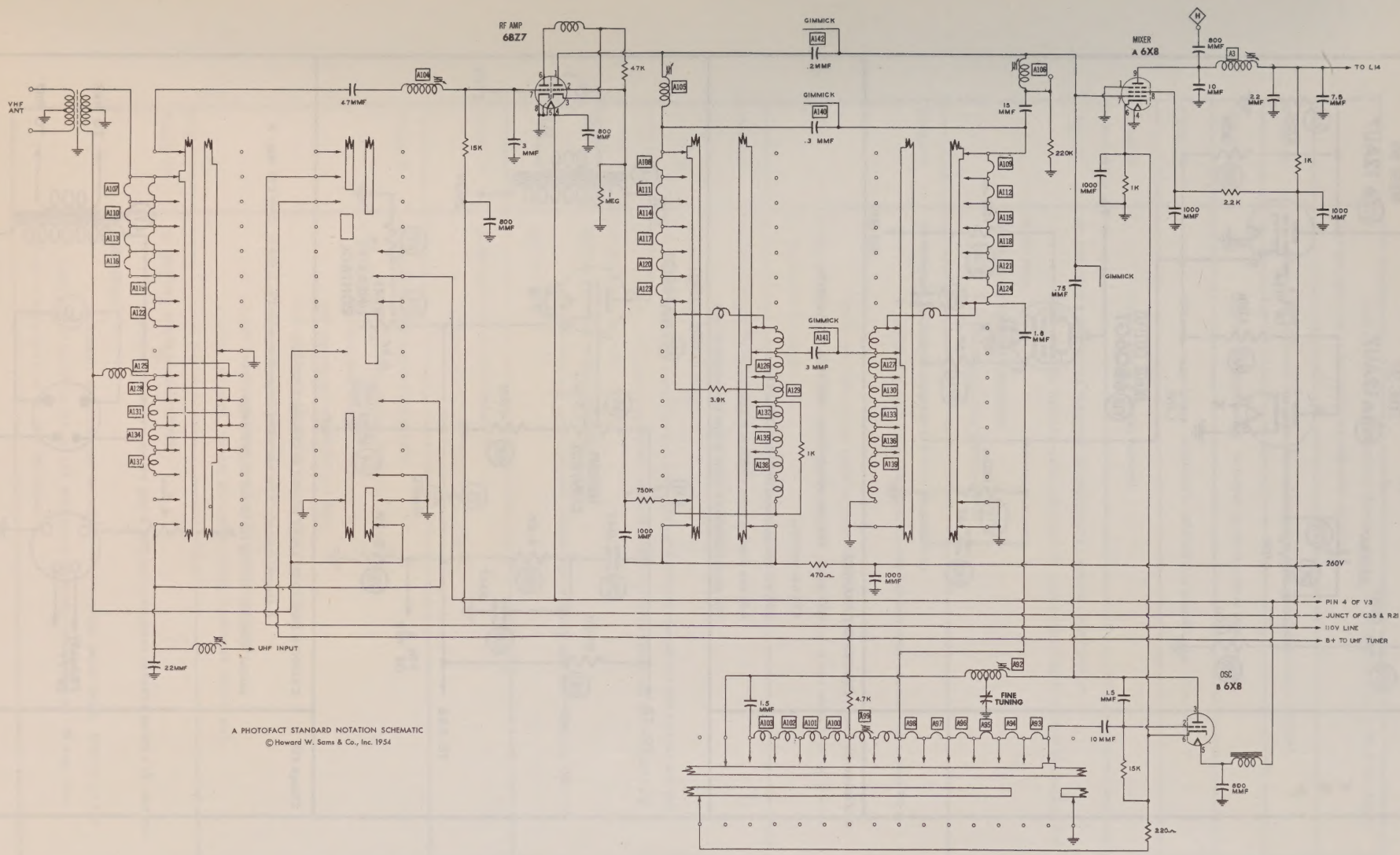

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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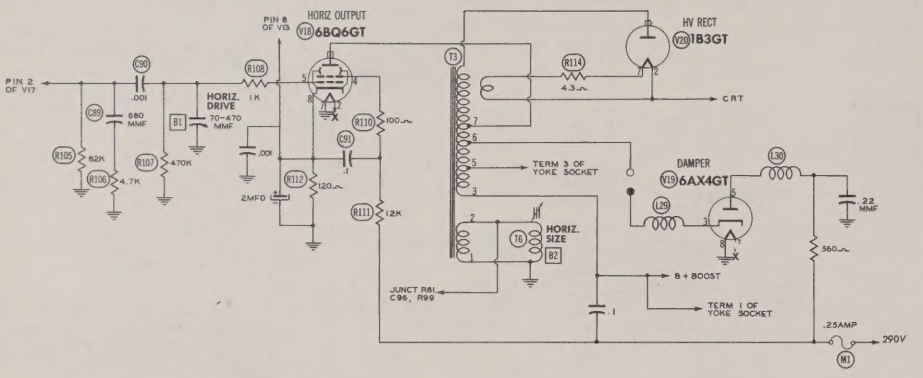
Change #13	HORIZONTAL OUTPUT TUBE CHANGED The horizontal output tube (V18) was changed from a type 6BQ6GT to a type 6CU6. No circuit changes were made when this tube is used. In addition to the above changes later production chassis include compression rings placed over the UHF dial sleeve and the brightness and fine tuning shafts. These rings are designed to eliminate knob slippage and recessing of the UHF dial. The part number for the compression ring for the brightness control is 554-0029, the fine tuning control 554-0030, and the UHF dial sleeve is 554-0031.
Chassis 1-530-1, 1-530-2	Chassis 1-530-1 and 1-530-2 are similar to Ch.1-520-1, -4, Code C07, respectively, except for the following: PICTURE TUBE CHANGED Chassis 1-530-1 and 1-530-2 use a 21WP4 picture tube. When the 21WP4 tube is used the filaments are connected to point **Y** instead of to point **X** as before. HORIZONTAL OUTPUT CIRCUIT REVISED The horizontal output circuit was revised for Ch. 1-530-1 and 1-530-2. A partial schematic showing the new circuit is given below. The part number for the new horizontal output transformer is 241-0019 and the horizontal frequency coil is changed to part #132-0005.
	
	NEW VHF TUNER Chassis 1-530-1 and 1-530-2 use a Sarkes Tarzian cascode tuner (part #323-0053). A schematic and alignment data for this tuner are given in this Production Change Bulletin. Chassis 1-530-2, also contains the G.I. UHF tuner shown on page 20 in Photofact Folder 13, Set 234.

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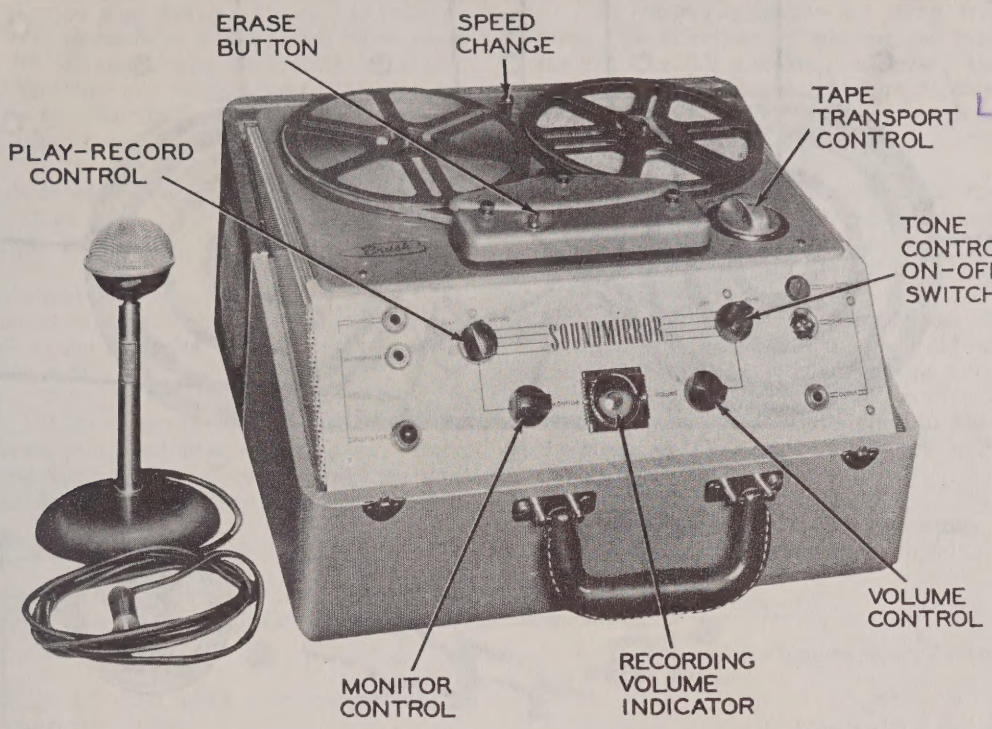

Figure 1

GENERAL INFORMATION

The Brush "Soundmirror" Model BK-455P features a single control knob for Off, Fast Forward, Fast Reverse, and Play or Record operations. This recorder is designed to record and play back two tracks of material on standard width recording tape, which doubles the playing time of a standard 5" or 7" reel with no loss of frequency response or quality. Recordings can be made from a radio, television receiver or phonograph, in addition to those made directly from the microphone. Recordings can be played back through the self-contained speaker or an external speaker through use of the "Output" jack.

This "Soundmirror" has two tape speeds, 7 1/2" and 3 3/4" per second. Using both channels of the tape the recording time is as follows:

Size	Speed 3 3/4"	Speed 7 1/2"
5" reel	1 hour	1/2 hour
7" reel	2 hours	1 hour

This recorder is designed to operate on 60 cycle, 110 volt, AC supply only.

CAUTION: Severe Damage May Result If Connection Is Made To A Direct Current (DC) Line.

Manufactured by:

Brush Electronics Company
3405 Perkins Avenue
Cleveland 14, Ohio

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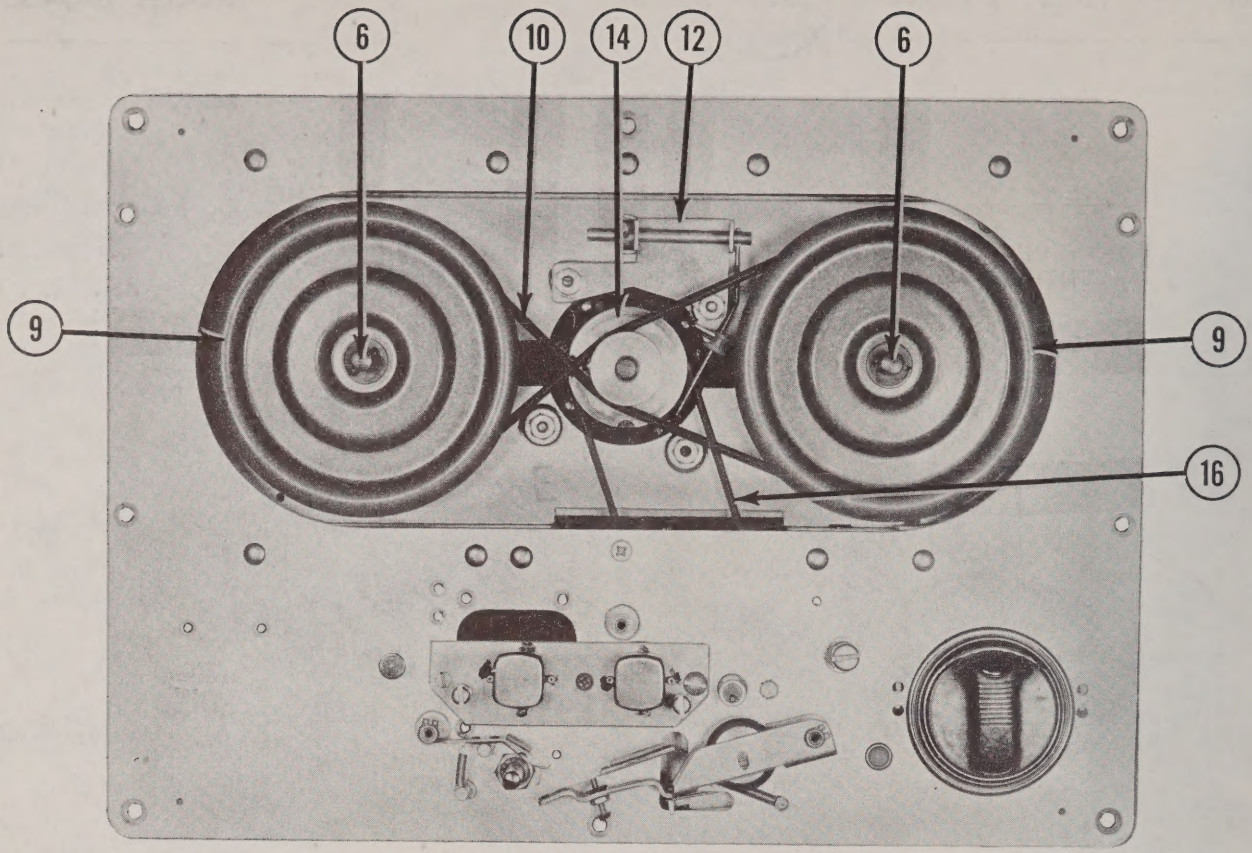

Figure 2

OPERATING CONTROLS

Tape Transport Control (5)-

The positions of this control are described as follows:

Off: Control centered and pointing toward numeral ①. While control (5) is in this position, the tape will not move in either direction.

Fast Forward: Control in upward position and turned fully clockwise pointing toward numeral ③.

Fast Reverse: Control in upward position and turned full counterclockwise toward numeral ②.

Play or Record: Control fully depressed when in the "Off" position ① and then turned fully clockwise pointing toward numeral ③ using a positive motion. If a positive motion is not used, tape breaking may result.

NOTE: When recording depress erase button (42) in addition to moving control (5) to Record Position.

Amplifier Controls - (Refer to Figure 1)-

Volume Control-

When playing a recording this controls the loudspeaker volume. When making a recording this regulates the voltage applied to the recording head, thus determining the level at which a recording will be made.

Play-Record Selector Switch-

This switch has two self-explanatory positions: Play and Record.

Monitor Control-

This control is effective only when the Play-Record Selector is in Record position. It then regulates the volume of the loudspeaker in its monitor function up to the level set by the Volume Control.

Off-On Tone Control-

As this switch is turned clockwise it first turns on power to the Soundmirror and then regulates tonal quality from bass to treble. The Tone Control function is effective on the speaker, but not on the reading circuit.

Recording Volume Indicator-

This indicates the intensity of the signal being fed to the record head, and serves as an index for adjusting the Volume Control during recording. The Volume Indicator will light and function only when the other related controls are in proper position for making a recording and its winking is a sure indication that recording is taking place.

OPERATING INSTRUCTIONS

Threading The Tape-

1. Place a full reel of tape on the supply reel turntable (lefthand) so that the reel will turn counterclockwise when tape is pulled from the reel.

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NOTE: The "Soundmirror" uses Type "A" wound tape, i. e. the dull magnetic coated side faces inward on the reel. If the tape used is Type "B" (coated side facing outward) the recording will be made at a very low sound level and the playback will be almost inaudible. Type "B" tape can be changed to "A" wind for use on the Soundmirror by winding the tape with a half twist.

2. Place an empty reel on the take-up or right hand spindle. Make sure one of the reel slots of each reel engages with the reel key on the spindles.

3. Pull about 18" of tape from the feed reel. Hold a section of tape straight with both hands and insert the tape in the tape slot between the two cover assemblies (1 and 2).

4. Insert the free end of the tape into one of the three radial slots in the hub of the empty reel. Turn the reel several turns counterclockwise until the tape is secured and all slack is taken up between reels.

To Record From Microphone-

1. Insert the AC power cord into the receptacle on the right side of the amplifier control panel (Figure 1).

2. Plug the AC cord into a convenient wall receptacle of the proper rating.

3. Turn the On-Off Tone Control to the right until a click is heard and allow about thirty seconds for the tubes to warm up.

4. Turn the "Play-Record" knob to "Record" position.

5. Set the "Volume Control" and "Monitor Control" to minimum volume (extreme counterclockwise).

NOTE: The "Monitor Control" is effective only when the recorder is in "Record" position. It then regulates the volume of the loudspeaker in its monitor function up to the level set by the "Volume Control".

6. Insert the Mike plug into the "Microphone Input Jack".

7. Depress mechanism control knob (5) and turn to position ③, after first depressing erase button (42) and holding erase button in this position until control (5) engages.

8. Turn the "Volume Control" clockwise until the incoming signal causes the "Record Volume Indicator" to just close on peak passages only.

NOTE: Correct recording volume is very important. Too weak a signal, which does not cause the "Record Indicator" to close, will result in weak playback and high background noise. Too strong a signal, causing the "Record Indicator" to overlap, will result in distortion during playback.

A recording is now being made and any sound entering the microphone will be recorded on the tape.

To Record From Radio Or Television Receiver-

1. Recordings can be made from a radio or television receiver by placing the microphone near the radio or TV speaker; however, this type of recording may not be satisfactory as other sounds may be picked up by the microphone which as a result will be recorded on the tape.

2. Better quality recordings can be made by attaching leads to the voice coil terminals of the radio or TV speaker and connecting these leads by means of a plug into the Radio Input Jack.

3. Highest quality recordings are obtained by taking the signal from the internal circuits of the radio or TV receiver by connecting across the volume control. This type of connection may be desired because any circuit deficiencies in the amplifier of the radio or TV receiver will not be included in the recording.

4. Proceed with the recording as described under "To Record From Microphone".

To Play A Recording-

1. Thread the tape as described under "Threading The Tape".

2. If a reel of tape on the recorder has been recorded and is to be played back, rewind the tape to the start of the recording.

3. Turn the Off-On Tone Control to the "On" position.

4. Place the Play-Record Selector Switch in the "Play" position.

5. Depress tape transport control (5) and turn to numeral ③.

6. Adjust the Volume and Tone Controls for desired listening level.

CAUTION: If the tape transport control (5) is left engaged in the Play or Record position when the recorder is not in use, a flat spot or detent may form on the pressure roller (17) resulting in "Wow" or a thumping noise when the recorder is used again.

To Use As P. A. System-

1. Insert the Mike plug into the Microphone Input Jack.

2. Turn the On-Off-Tone Control to "On" position.

3. Turn the Play-Record Knob to "Record" position.

4. Depress the erase button (42) and turn the Volume Control to the right until the incoming signal causes the Recording Volume Indicator to almost close.

5. Start with the Monitor Control completely to the left and gradually turn to the right, being careful not to set the level so high that acoustic "feed back"

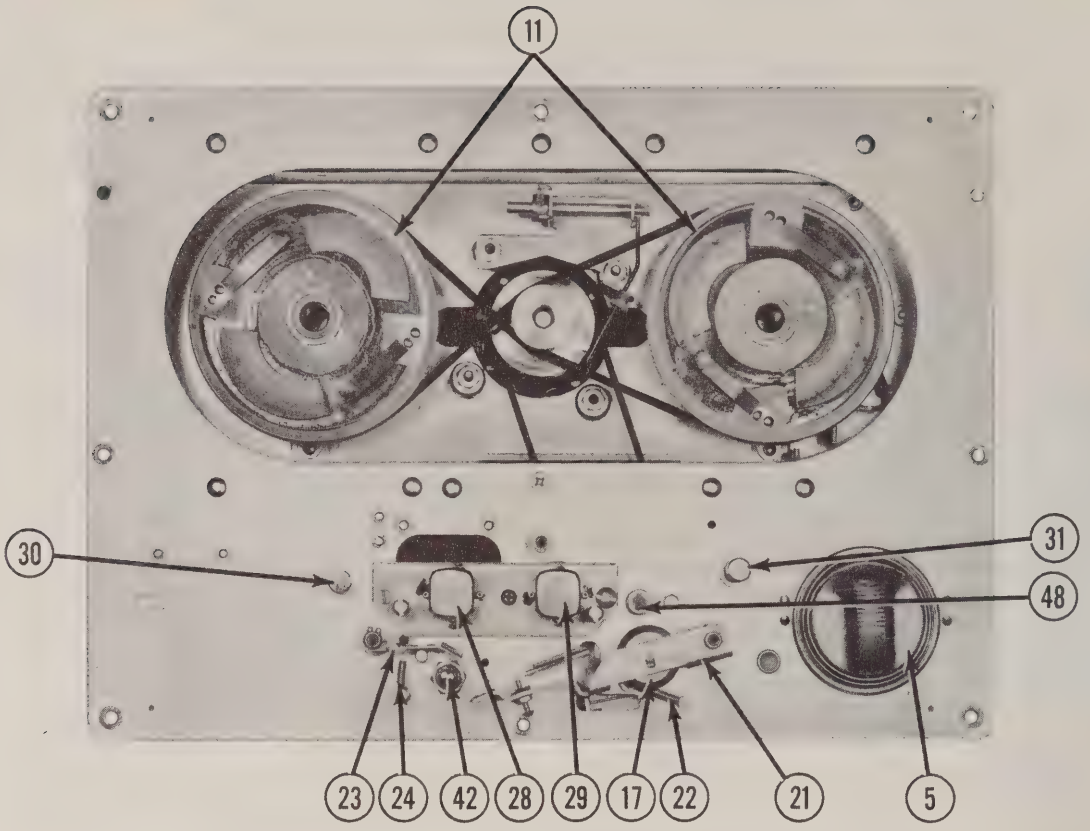

Figure 3

sets in. Remember that the Volume Control limits the top volume obtainable from the Monitor Control.

To Edit and Splice Tape-

NOTE: Since it is impossible to edit and splice one track without affecting the other, recordings which are to be edited should be limited to one track only.

1. The tape may be edited by cutting out unwanted portions, or by joining selections into another sequence. Announcements may be inserted between selections, etc. Unused sections of tape can be spliced together for re-use.

2. For best results, cut tape at a slight diagonal, join ends together with splicing tape on the glossy side and trim off any excessive width.

Erasing Recorded Material-

Erasing of recorded material takes place automatically when new material is recorded; therefore, no special step is necessary to erase old recordings before new recordings are made.

MECHANICAL FUNCTIONS

Drive Mechanism-

The drive mechanism includes the following:

1. A single motor (53) drives both the capstan and pulley assembly (47) and the reeling mechanism. A fan is attached to the drive motor shaft to cool the motor.

2. Rubber belts (10 and 16) couple the motor drive pulley (14), which is mounted on the motor shaft, to the capstan assembly and reeling mechanism. The smaller belt (16) drives the capstan while the large belt (10) drives the reels.

3. The capstan is attached to a balanced flywheel and pulley and provides a constant drive speed for the tape. The capstan revolves in two "Oilite" bearings and require no additional lubrication. The bottom bearing is of the self-aligning type.

4. The pressure wheel (17) and pressure pad (21A) are assembled on the pressure wheel bracket (21). When control knob (5) is depressed and turned to numeral ③, the pressure wheel bracket is actuated causing the pressure wheel (17) and pressure pad (21A) to press the tape against the capstan and play-record head. Also, as the pressure wheel bracket (21) moves inward it engages the erase head pressure arm and pad assembly (23) and moves it in to hold the tape against the erase head (28).

Reeling Mechanism-

Cemented to the top surface of the clutch cup pulleys (11) are felt pads which are capable of engaging the lower surface of the reel drive cups (9) with the action of a light friction clutch. The direction of rotation of the pulleys (11) is such that each reel drive cup (9), when resting on its pulley, tends to reel in tape. A pair of cams (37 and 38) are provided, one under each reel shaft, to lift the reel drive cups (9) free of the pulleys. Two small felt pads which are mounted on springs on the clutch cup pulleys (11) re-

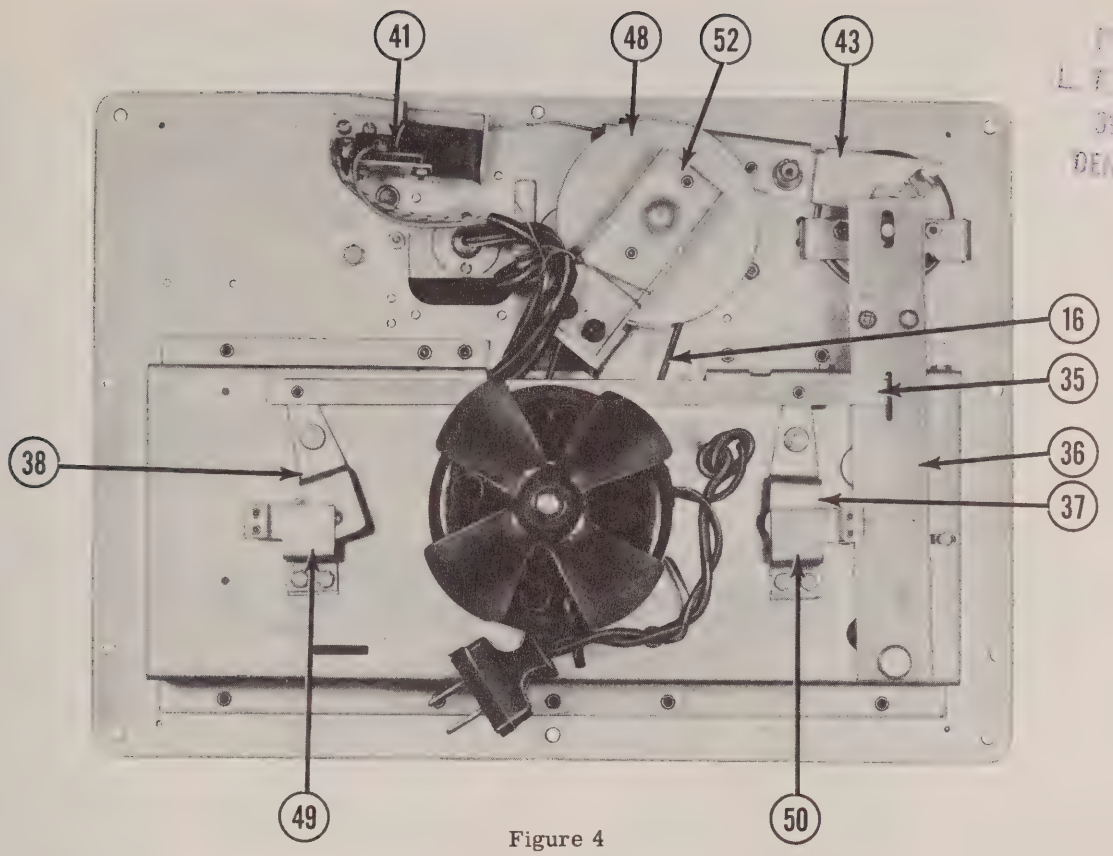

Figure 4

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main in contact with the reel drive cups (9) when they are elevated, and in turn offer a slight amount of reverse drive torque when the tape is being pulled from a reel. This action provides back tension to the tape and insures that the tape is wound tightly in fast forward and fast reverse.

Speed Change Mechanism-

The speed bracket assembly (12) consists of a wire rod bent in such a manner so as to loop around the capstan drive belt (16). The drive belt (16) rides in one of two pulley surfaces on the motor drive pulley (14), the lowermost or largest diameter pulley being for 7 1/2" per second and the smaller diameter pulley located directly above the lowermost pulley for 3 3/4" per second. When speed shift knob (3) is moved either back or forward, the formed wire rod on the speed bracket (12) lifts or lowers the capstan drive belt (16) from one pulley surface to the other.

Control Mechanism-

When control knob assembly (5) is turned to either position ② or ③ the following action takes place.

1. The clutch lever (36) is pivoted to the left or right, depending on the direction control knob (5) has been turned, causing the switch actuator bracket (46) to actuate toggle switch (34) thus supplying power to the motor. Simultaneously, the cam link (35), actuated by clutch lever (36), pivots the lifter cams (37 and 38). One cam is moved from under the lifter pin (15) allowing the reel drive cup (9) to engage with the felt pads while the other lifter cam raises the lifter pin and reel drive cup to allow the reel drive cup to turn freely while tape is being wound on the opposite reel.

2. When control knob (5) is turned to position numeral ①, the clutch lever (36) is centered, opening motor switch (34) and allowing both reel drive cups (9) to engage their clutches. This acts as a brake to halt the tape.

3. When control knob (5) is depressed and turned to Play-Record position numeral ③, it rotates control arm assembly (43) and locks it in position. The spring extending from control arm (43) applies pressure against erase pin (42) providing a jam proof arrangement for depressing the erase pin either before or after control arm (43) is actuated. The pressure wheel bracket (21) is also actuated by control arm (43) and causes the pressure wheel (17) to press the tape against the capstan, thus causing the tape to be driven at a constant speed.

DISASSEMBLY INSTRUCTIONS

1. Remove the head cover assembly (1) and the pressure wheel cover assembly (2).

2. Remove four screws holding cover panel (4). Remove panel (4).

3. Remove three screws located at rear of mechanical panel (25).

4. Remove two screws holding handle to carrying case.

5. Lift unit out of case, removing power supply and speaker plug before removing unit completely.

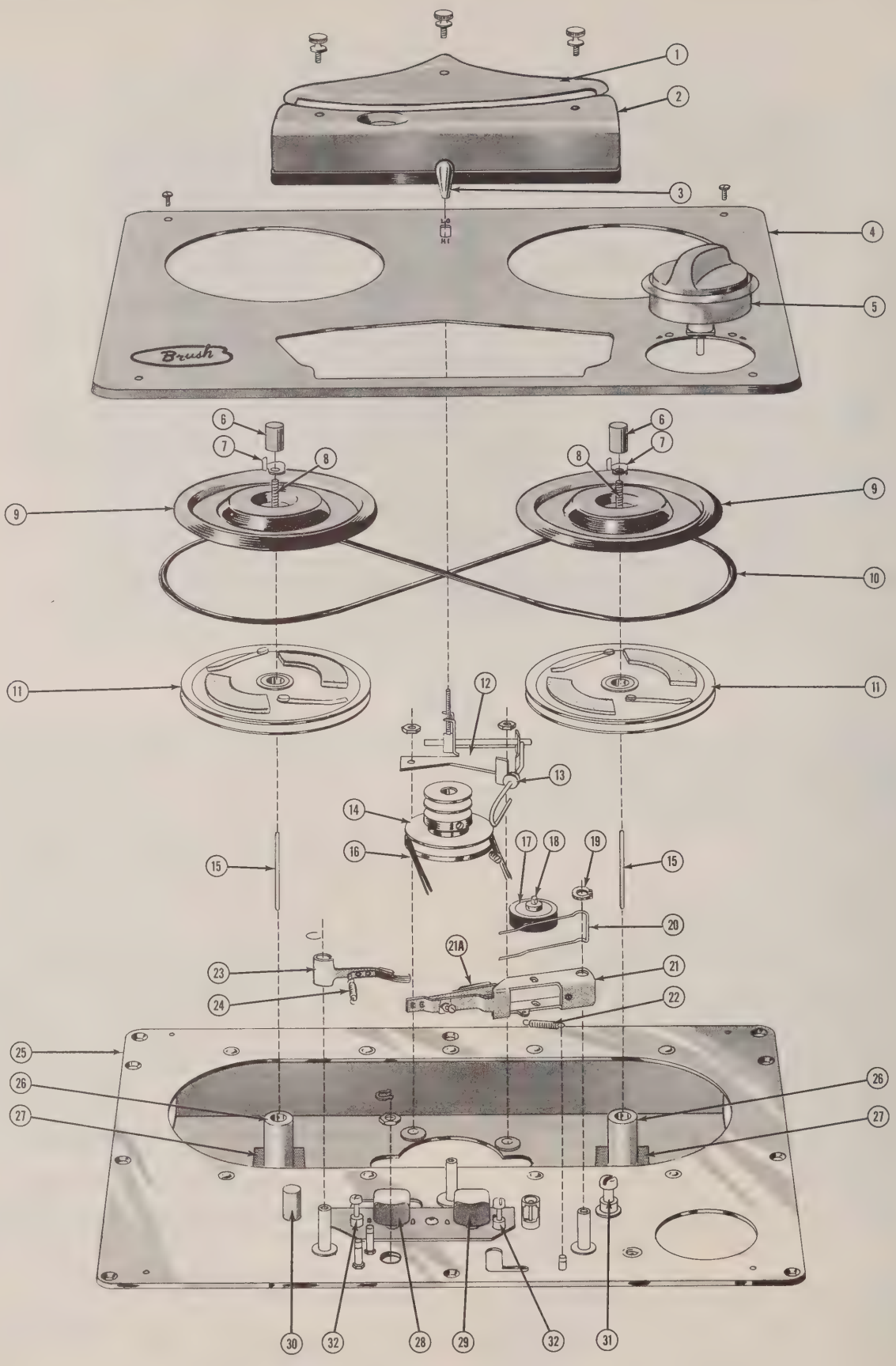

Figure 5A. Exploded View Of Parts Above Baseplate.

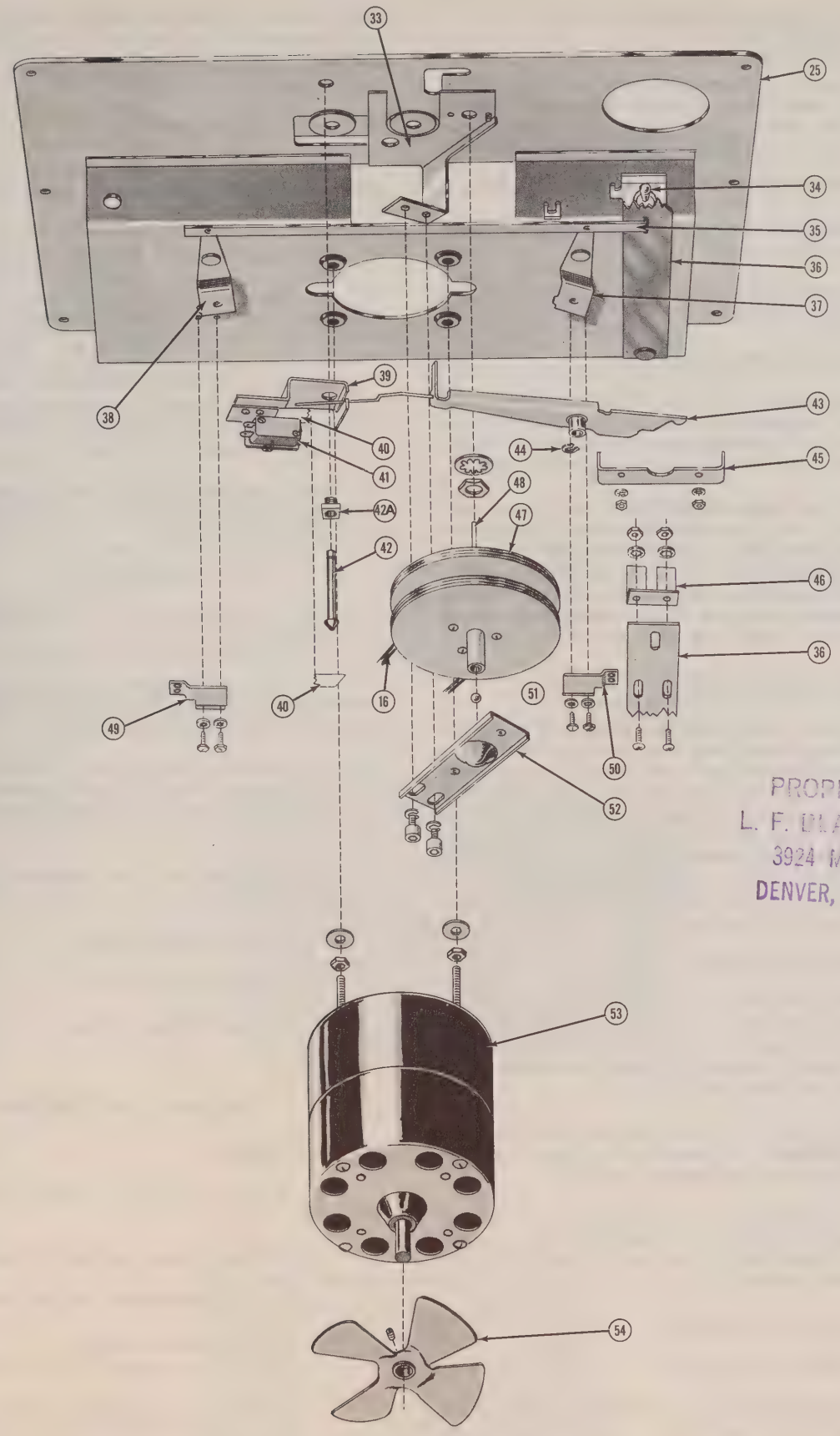

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Figure 5B. Exploded View Of Parts Below Baseplate.

Replacement of Pressure Wheel Bracket Assembly (21)-

The pressure wheel assembly consists of the bracket (21), shaft (18), pressure wheel (17), spring (20), and the pressure pad which is attached to the bracket. Replace the complete assembly as follows:

1. Remove the "Truarc" retaining ring (19).

2. Lift the assembly off its mounting post after disconnecting spring (22).

3. Slide new assembly onto mounting post and connect spring (22).

Adjustment of Pressure Roller (17)-

The amount of pressure of the pressure wheel (17) against the tape and capstan is adjusted at the factory. It is not recommended that any adjustment be attempted, but that the defective part be replaced.

If the tape tends to crawl up or down on the capstan, check to see if spring (20) is seated properly in the groove of shaft (18). If this is not the cause, then spring (20) may be bent in a manner causing more pressure from one arm than the other. Since this is a critical adjustment it is recommended that spring (20) be replaced rather than adjusted.

Replacement of Pressure Pads-

When it becomes necessary to replace the pressure pads (which have been worn down by the friction set up between the pads and tape), remove the old pads and all foreign material from where the old pads were cemented. Use a quick drying cement and position the pads in their respective location. Care should be taken to prevent any cement from getting on the felt which contacts the tape. After the pads have been replaced, adjust the tape tension as described under "Adjustment of Tape Tension".

Adjustment Of Tape Tension-

The tape tension is measured by attaching a spring scale to the end of a piece of tape drawn only past the erase head (28); then past the record head (29). The tension required to move the tape past the heads should be from 1 to 1 1/2 oz.

The pressure of the tape against the erase head (28) can be adjusted by bending the copper colored leaf spring located on pressure arm (23).

The pressure of the tape against the record head (29) can be adjusted by loosening the hex nut and turning the slotted head screw which is located on the pressure wheel bracket (21).

Play-Record Head Adjustment-

1. Remove head cover (1).

2. Properly thread an alignment tape or a good recorded tape on the machine.

3. Set the controls as described under "To Play A Recording".

4. By turning the Allen Head set screws, located on either side of the play-record head (29), rock the head from side to side slightly until the maximum high frequencies are obtained. After the adjustment has been made place a drop of cement on each set screw to hold the adjustment.

Adjustment of Clutches-

The clutches are adjusted by the clutch adjusting screws (8). Check clutches for proper adjustment as follows:

1. Turn off power to the Soundmirror.

2. Place a loaded reel of tape on the left hand turntable, then turn control knob (5) to position numeral ③. As this is done the turntable and reel should rise very slightly, not over 1/32 of an inch. If the turntable does not rise this amount or exceeds this dimension, loosen the tapped turntable washer and adjust screw (8) until this condition is corrected.

Make the same adjustment for the right hand turntable with the exception of control knob (5) which is turned to numeral ②.

LUBRICATION

The motor should be oiled every three months with #20 SAE oil.

All moving or sliding parts should be cleaned to remove all foreign matter before lubricating. After cleaning, apply a light coat of oil.

NOTE: Avoid over lubrication. Wipe off all excessive oil. Do not allow lubricant to come in contact with any drive surfaces or rubber belts.

The following are oilite type bearings and need very little lubrication:

1. Clutch pulley bearing.

2. Capstan spindle bearing.

3. Pressure wheel bearing.

TROUBLES AND REMEDIES

Wow And Flutter-

1. Motor pulley (14) loose on motor shaft. Tighten.

2. Pressure pads applying too much pressure against tape.
   (a) See "Adjustment of Tape Tension".

3. Bent capstan shaft (48).
   (a) Replace capstan drive assembly.

4. Damaged or oily capstan drive belt (16).
   (a) Clean belt with alcohol; if worn, replace.

5. Binding motor shaft.
   (a) Repair or replace motor.

6. Binding reel post bearing.
   (a) Clean or replace bearing or reel post.

Tape Fails To Wind On Reel-

1. Clutch out of adjustment.
   (a) See "Adjustment Of Clutches".

2. Clutch belt (10) slipping.
   (a) Clean motor drive pulley.

3. Reel key (7) broken allowing reel to slip on turntable.
   (a) Replace reel key (7).

Poor Frequency Response-

1. Too much or too little bias. This can be caused by the frequency varying from the desired 40 KC.
   (a) Replace faulty component.

2. Defective component in compensating network.
   (a) Replace.

3. Accumulation of dirt on tape, residue on play-record head.
   (a) See "Cleaning".

No Erase And "Magic Eye" Does Not Function-

1. Erase button (42) not depressed.

2. Check erase switch (41) to see if it is operating properly. Adjust if necessary.

3. Defective play-record switch. Replace.

4. Erase actuator leaf spring (40) bent.
   (a) Adjust by bending or replace.

Tape Breaks At Capstan Spindle-

1. Too little pressure on head pads.
   (a) Adjust pressure pads.

2. Dirty capstan spindle.
   (a) Clean.

3. Worn capstan spindle.
   (a) Replace.

4. Pressure wheel worn.
   (a) Replace.

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CLEANING

The play-record head, erase head, capstan, and pressure roller are subject to an accumulation of tape coating residue, which is worn off the tape as it passes these parts. Use a soft cloth and alcohol to clean these surfaces.

NOTE: Do not use a brush or metallic object when cleaning the heads as this could possibly mar the head surfaces.

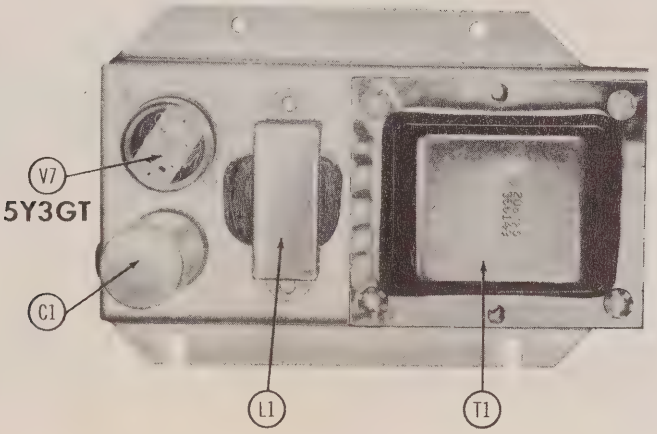


Figure 6

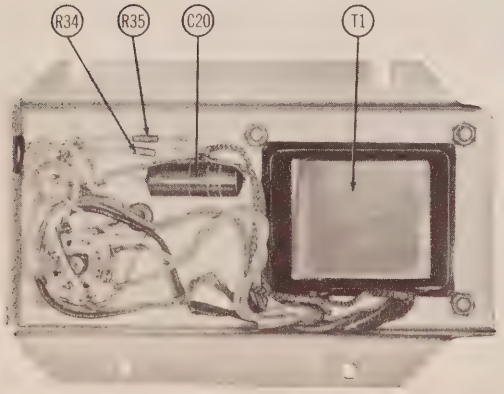
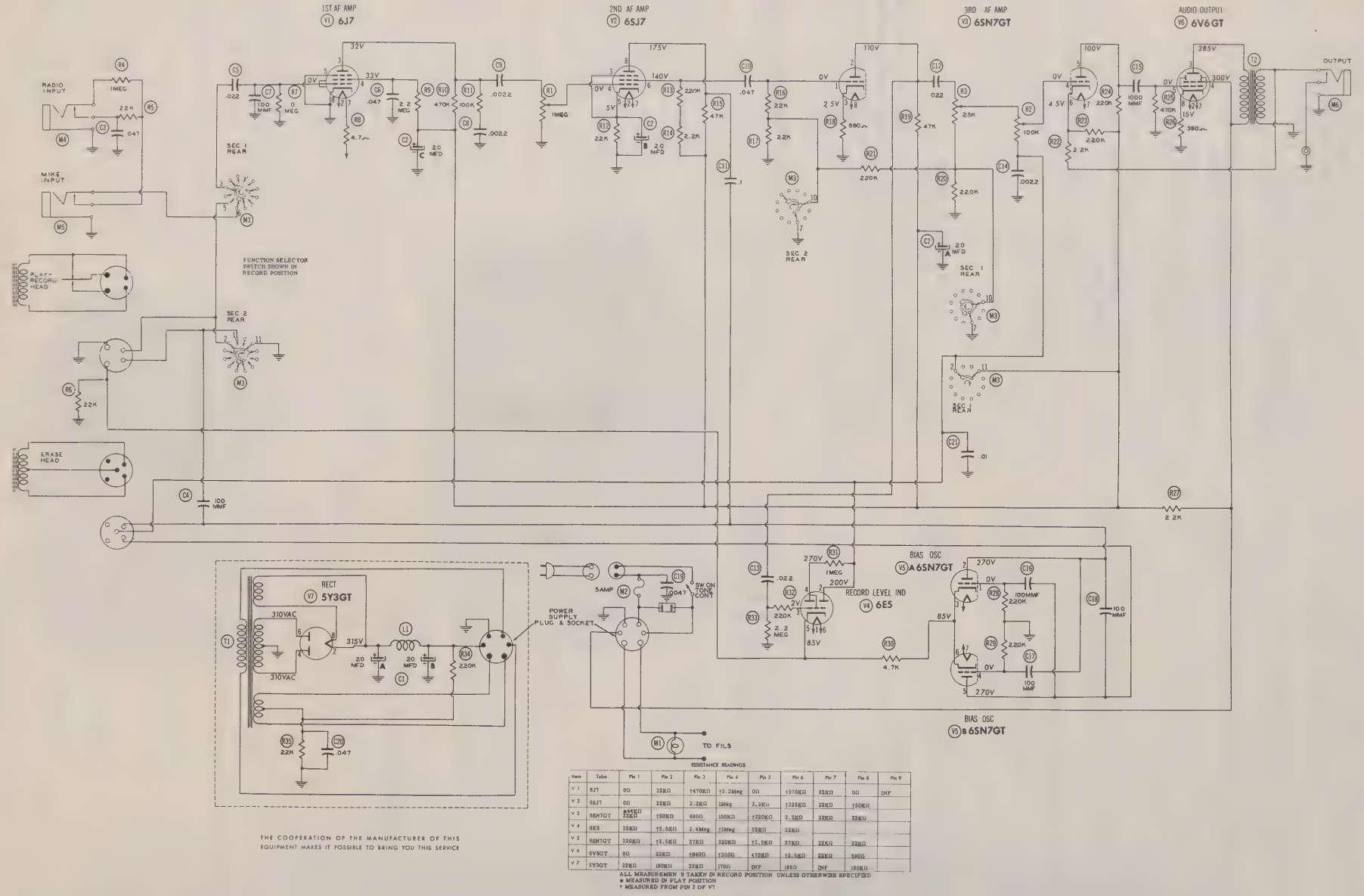


Figure 7



Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6J7	0Ω	22KΩ	†470KΩ	†2.2Meg	0Ω	†370KΩ	22KΩ	0Ω	DNF
V 2	6SJ7	0Ω	22KΩ	2.2KΩ	1Meg	2.2KΩ	†225KΩ	22KΩ	†50KΩ	
V 3	6SN7GT	445KΩ 22KΩ	†50KΩ	680Ω	150KΩ	†220KΩ	2.2KΩ	22KΩ	22KΩ	
V 4	6E5	22KΩ	†2.5KΩ	2.4Meg	†1Meg	22KΩ	22KΩ			
V 5	6SN7GT	220KΩ	†2.5KΩ	27KΩ	220KΩ	†2.5KΩ	27KΩ	22KΩ	22KΩ	
V 6	6V6GT	0Ω	22KΩ	†840Ω	†350Ω	470KΩ	†2.5KΩ	22KΩ	390Ω	
V 7	5Y3GT	22KΩ	130KΩ	22KΩ	†70Ω	DNF		185Ω	DNF	130KΩ

ALL MEASUREMENTS TAKEN IN RECORD POSITION UNLESS OTHERWISE SPECIFIED
● MEASURED IN PLAY POSITION
† MEASURED FROM PIN 2 OF V7

THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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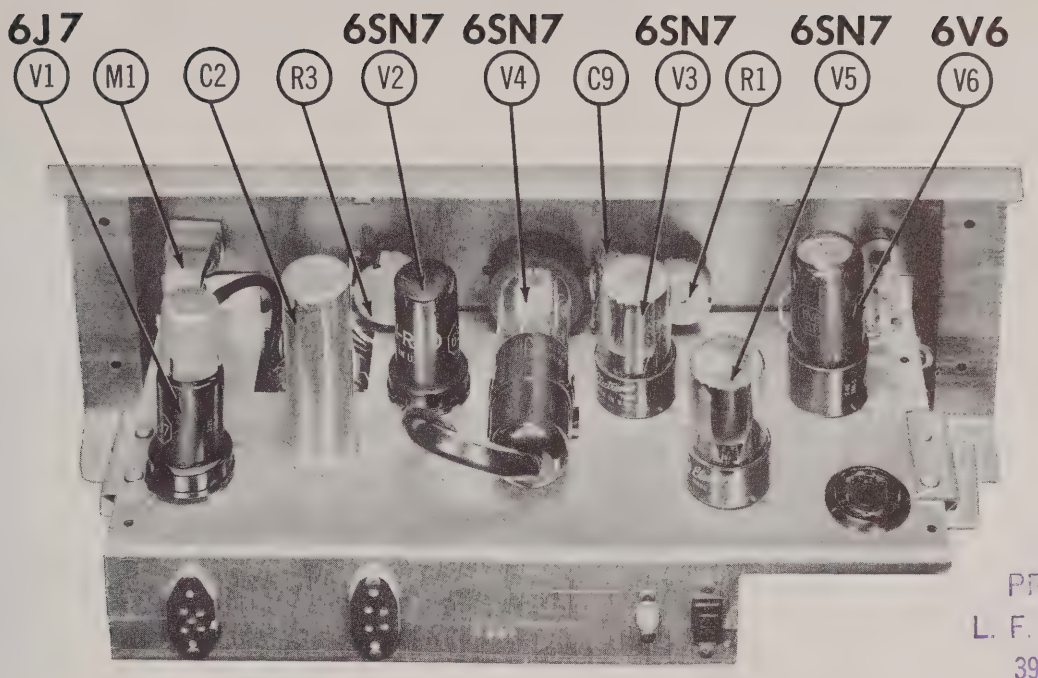

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Figure 8

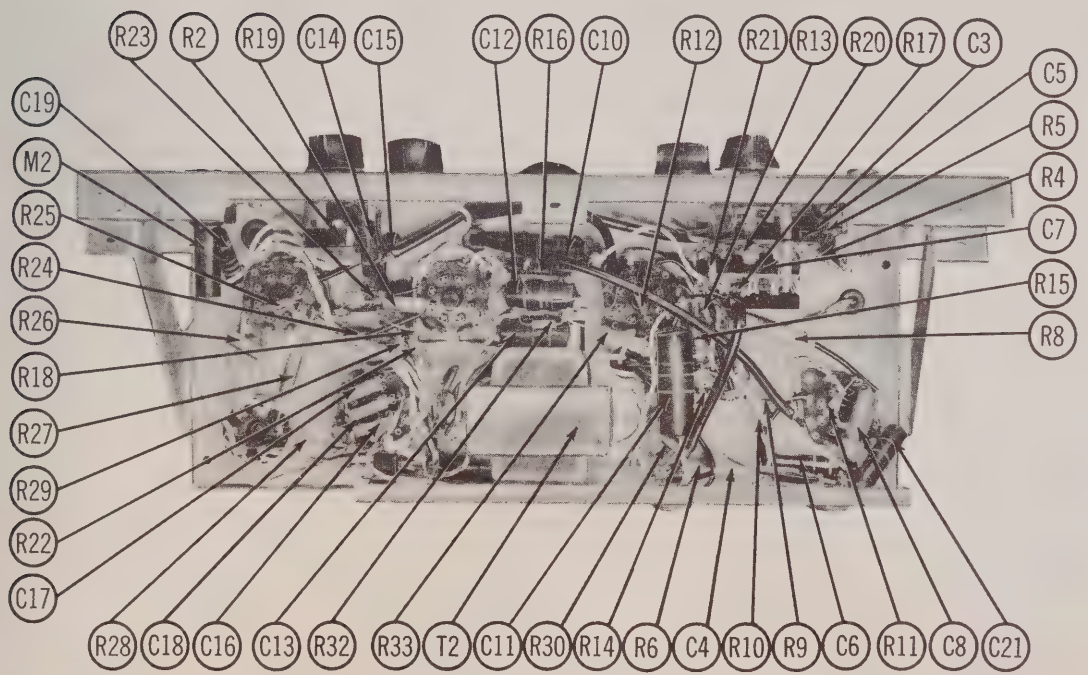


Figure 9

MECHANICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1	110326-PL1	Head Cover Assembly	9		Reel Drive Cup
2	310313-501	Pressure Wheel Cover Assy.	10	106340	Clutch Drive Belt
3	116637	Speed Shift Knob	11		Clutch Cup Pulley
4	310208-501	Cover Panel Assembly	12	216356-501A	Speed Bracket Assembly
5	110312-501	Control Knob Assembly	13	116318	Nylon Roller
6	114102	Reel Clamping Knob	14	216401B	Motor Drive Pulley
7	116754	Reel Key	15	114101	Clutch Lifter Pin
8	10-32x3/4"	Allen Head Set Screw	16	106339	Capstan Drive Belt

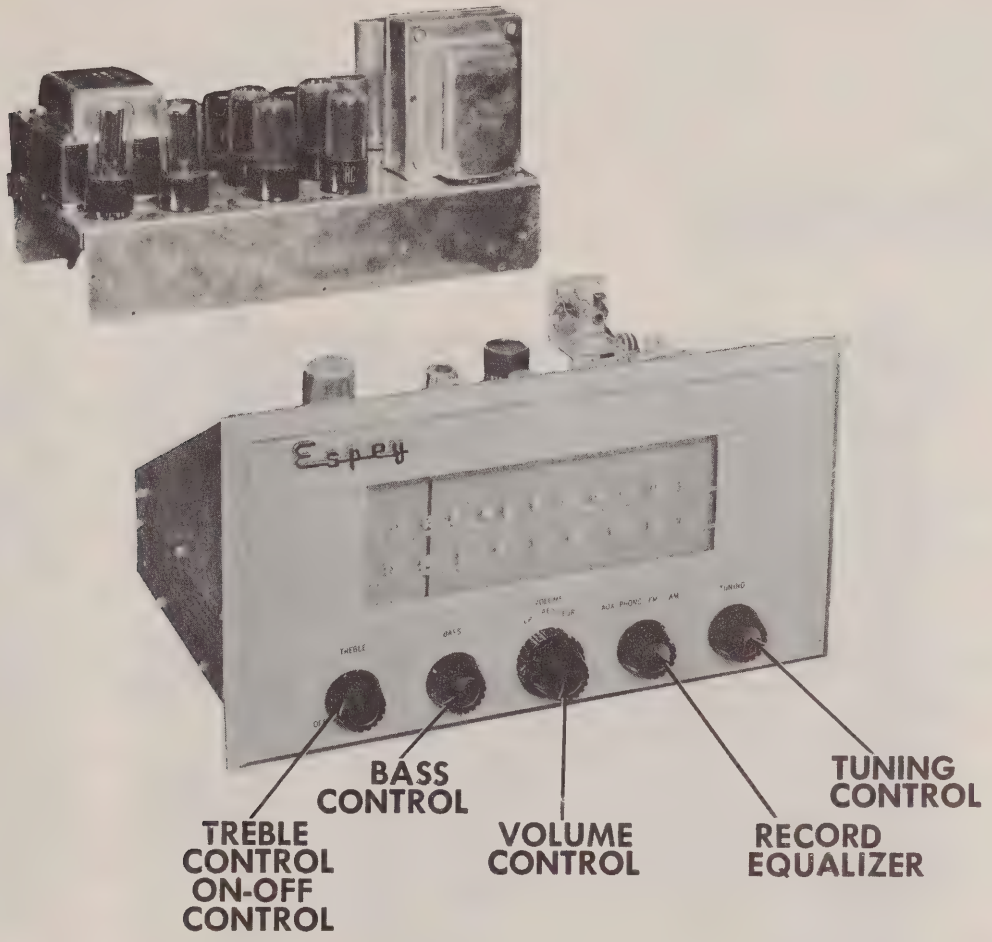
MECHANICAL PARTS LIST - Con't.

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
17	106125-501G	Pressure Wheel Assembly	37		Lifter Cam - Take-up Reel
18	106127K	Pressure Wheel Shaft	38		Lifter Cam - Supply Reel
19	104307-2	Truarc Retaining Ring	39	114008	Micro Switch Mounting Bracket
20	106128A	Pressure Wheel Spring			
21		Pressure Wheel Bracket	40	110027B	Leaf Spring
21A	106129B	Pressure Pad for Record Head	41	112791	Switch, Micro-S. P. D. T.
22	110078D	Pressure Wheel Bracket Spring	42	110016H	Erase Switch Actuating Pin
23	110056-501	Erase Head Pressure Arm & Pad Assembly	42A	101643E	Erase Pin Sleeve
			43	112822-501	Control Arm Assembly
24	110076A	Pressure Arm Spring	44	104307-2	Truarc Retaining Ring
25	110327-PL1	Mechanical Panel Assembly	45	110028B	Control Mounting Clamp
26	106364-501M	Spindle Bearing Assembly	46	209823-501A	Capstan Drive Assy.; Includes Spindle Bearing, Spindle, Flywheel, Pulley, Lower Bearing and Mounting Bracket
27	114173-17	Tinnerman Nut			
28	212046-501J	Erase Head Assembly			
29	215198-501	Record Head Assembly			
	216559-501	Complete Head Assembly, Erase & Record (Consists of Items 28 and 29)	48	209800-501	Capstan Shaft Assy. with Plates
			49	210180-501	Clutch Lifter Bracket-Supply Reel
30	106262E	Tape Guide Post-Left Hand			
31	115514A	Tape Guide Post-Right Hand	50	106407-501C	Clutch Lifter Bracket-Take-up Reel
32	115513B	Tape Guide Post - Center			
33		Flywheel Mounting Bracket	51	104636-1	Ball Bearing
34	110111	Toggle Switch	52	106394-501C	Bottom Bearing Bracket Assy.
35		Cam Link	53	317438	Drive Motor
36		Clutch Lever	54	111783	Fan Blade

ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
V1	7075	6J7, 1st. AF Amp.	R9	5-115557-225	Resistor, 2.2 Meg., 1/2 Watt
V2	105205	6SJ7, 2nd. AF Amp.	R10	5-115557-474	Resistor, 470KΩ, 1/2 Watt
V3	103185	6SN7, 3rd. AF Amp.	R11	5-115557-104	Resistor, 100KΩ, 1/2 Watt
V4	105206	6E5, Record Level Indicator	R12	5-115557-222	Resistor, 2200Ω, 1/2 Watt
V5	103185	6SN7, Bias Oscillator	R13	5-115557-224	Resistor, 220KΩ, 1/2 Watt
V6	102709	6V6, Audio Output	R14	5-115557-222	Resistor, 2200Ω, 1/2 Watt
V7	102705	5Y3GT, Rectifier	R15	5-115558-473	Resistor, 47KΩ, 1 Watt
C1A	102711	Elect. Cap., 20mfd. @450V.	R16	5-115557-223	Resistor, 22KΩ, 1/2 Watt
C1B		Elect. Cap., 20mfd. @450V.	R17	5-115557-223	Resistor, 22KΩ, 1/2 Watt
C2A	103253	Elect. Cap., 20mfd. @450V.	R18	5-115557-681	Resistor, 680Ω, 1/2 Watt
C2B		Elect. Cap., 20mfd. @25V.	R19	5-115558-473	Resistor, 47KΩ, 1 Watt
C2C		Elect. Cap., 20mfd. @450V.	R20	5-115557-224	Resistor, 220KΩ, 1/2 Watt
C3	20-112034-473	.047mfd. @600V.	R21	5-115557-224	Resistor, 220KΩ, 1/2 Watt
C4	1-109354-3	100mmf., Mica	R22	5-115557-222	Resistor, 2200Ω, 1/2 Watt
C5	20-113115-223	.022mfd. @600V.	R23	5-115557-224	Resistor, 220KΩ, 1/2 Watt
C6	20-112034-473	.047mfd. @600V.	R24	5-115557-224	Resistor, 220KΩ, 1/2 Watt
C7	1-109354-3	100mmf., Mica	R25	5-115557-474	Resistor, 470KΩ, 1/2 Watt
C8	20-113115-222	.0022mfd. @600V.	R26	5-115558-391	Resistor, 390Ω, 1 Watt
C9	20-113115-222	.0022mfd. @600V.	R27	5-115558-222	Resistor, 2200Ω, 1 Watt
C10	20-112034-473	.047mfd. @600V.	R28	5-115557-224	Resistor, 220KΩ, 1/2 Watt
C11	20-112034-104	.1mfd. @600V.	R29	5-115557-224	Resistor, 220KΩ, 1/2 Watt
C12	20-113115-223	.022mfd. @600V.	R30	5-115557-472	Resistor, 4.7KΩ, 1/2 Watt
C13	20-113115-223	.022mfd. @600V.	R31	3-106771-3	Resistor, 1 Meg., 1/2 Watt
C14	20-113115-222	.0022mfd. @600V.	R32	5-115557-224	Resistor, 220KΩ, 1/2 Watt
C15	20-113115-102	1000mmf.	R33	5-115557-225	Resistor, 2.2 Meg., 1/2 Watt
C16	1-109354-3	100mmf., Mica	R34	5-115557-224	Resistor, 220KΩ, 1/2 Watt
C17	1-109354-3	100mmf., Mica	R35	5-115557-223	Resistor, 22KΩ, 1/2 Watt
C18	1-109354-3	100mmf., Mica	T1		Power Transformer
C19	20-112034-472	.0047mfd. @600V.	T2	208913	Output Transformer
C20	20-112034-473	.047mfd. @600V.	SP1		Speaker
R1	103469	Volume Control, 1 Meg.	L1	200925	Filter Choke
R2	106762-1	Tone Cont., On-Off Sw. 100KΩ	M1	105710-1	Pilot Lamp, Type #44
R3	103469-2	Monitor Cont., 25KΩ	M2	102625-9	Fuse, 5 Amp.
R4	5-115557-105	Resistor, 1Meg., 1/2 Watt	M3	106746-3	Selector Switch
R5	5-115557-223	Resistor, 22KΩ, 1/2 Watt	M4	21421-3	Radio Input Jack
R6	5-115557-223	Resistor, 22KΩ, 1/2 Watt	M5	21421-3	Mic. Input Jack
R7	5-115557-106	Resistor, 10 Meg., 1/2 Watt	M6	21421-3	Output Jack
R8	5-115555-4R7	Resistor, 4.7Ω, 1 Watt			

ESPEY
MODELS 400, 500



ESPEY
MODELS 400, 500

TRADE NAME	Espey Models 400 (AM-FM Tuner), 500 (Audio & Power Supply)
MANUFACTURER	Espey Mfg. Co., Inc., 528 E. 72nd. St., New York 21, N.Y.
TYPE SET	AM-FM Superheterodyne Tuner With Separate Audio & Power Supply Chassis
TUBES	Nineteen
POWER SUPPLY	105-125 Volts AC-50/60 Cycles RATING 1.35 Amp.
TUNING RANGE - BROADCAST	535KC-1720KC FREQ. MOD. 88-108MC

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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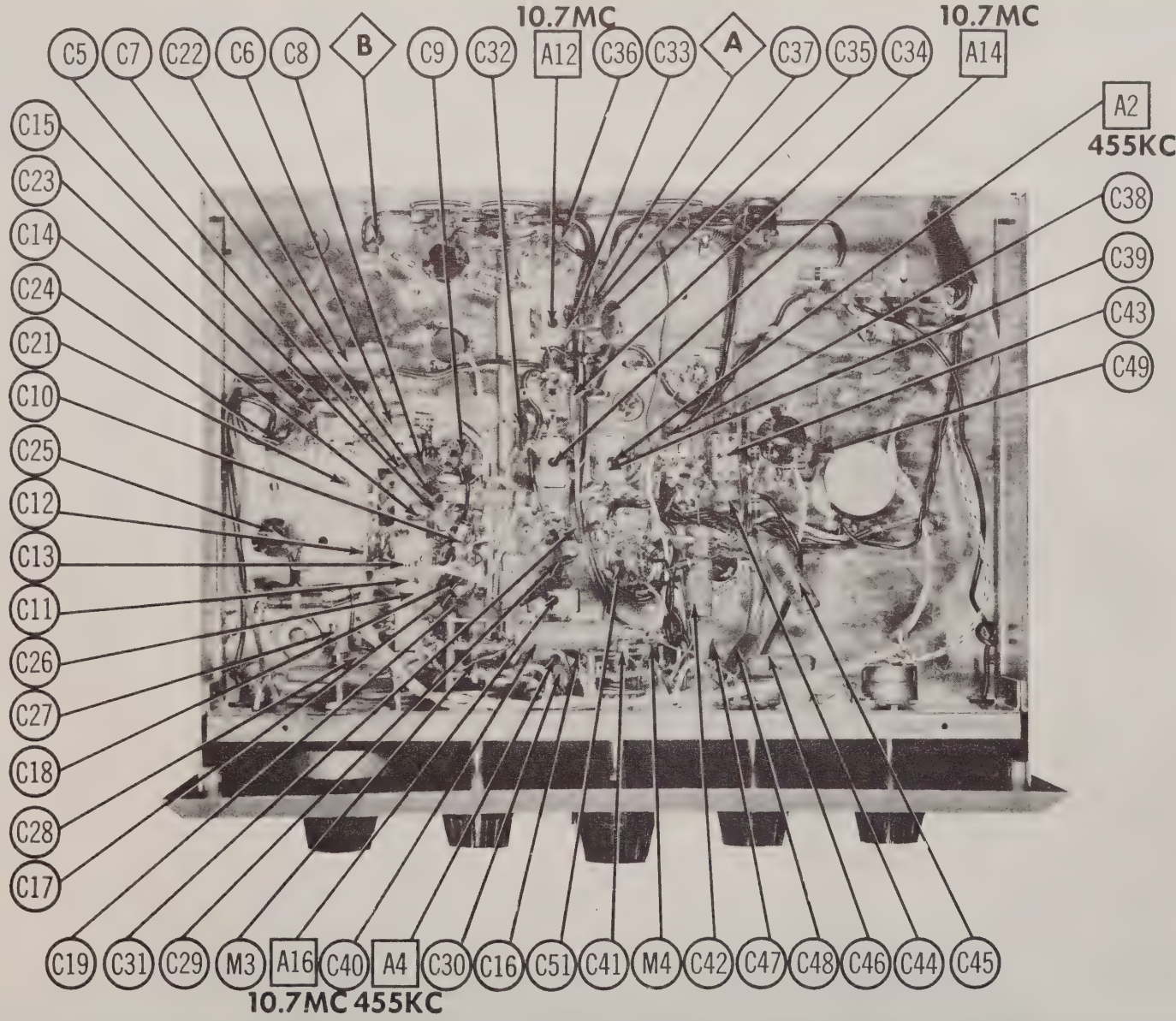
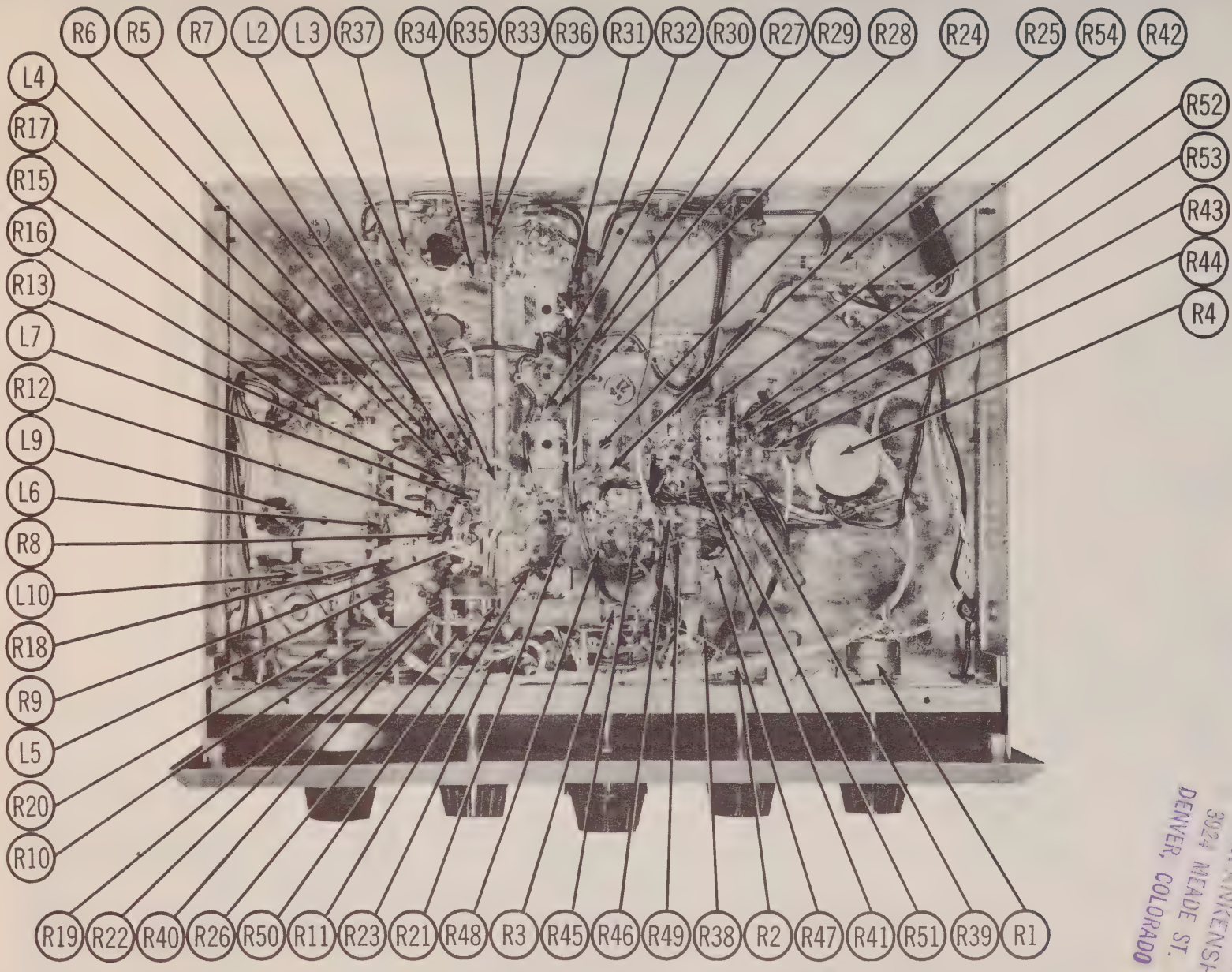


MODEL 400-CHASSIS BOTTOM VIEW CAPACITOR IDENT.



MODEL 400 – CHASSIS BOTTOM VIEW – RESISTOR IDENT.

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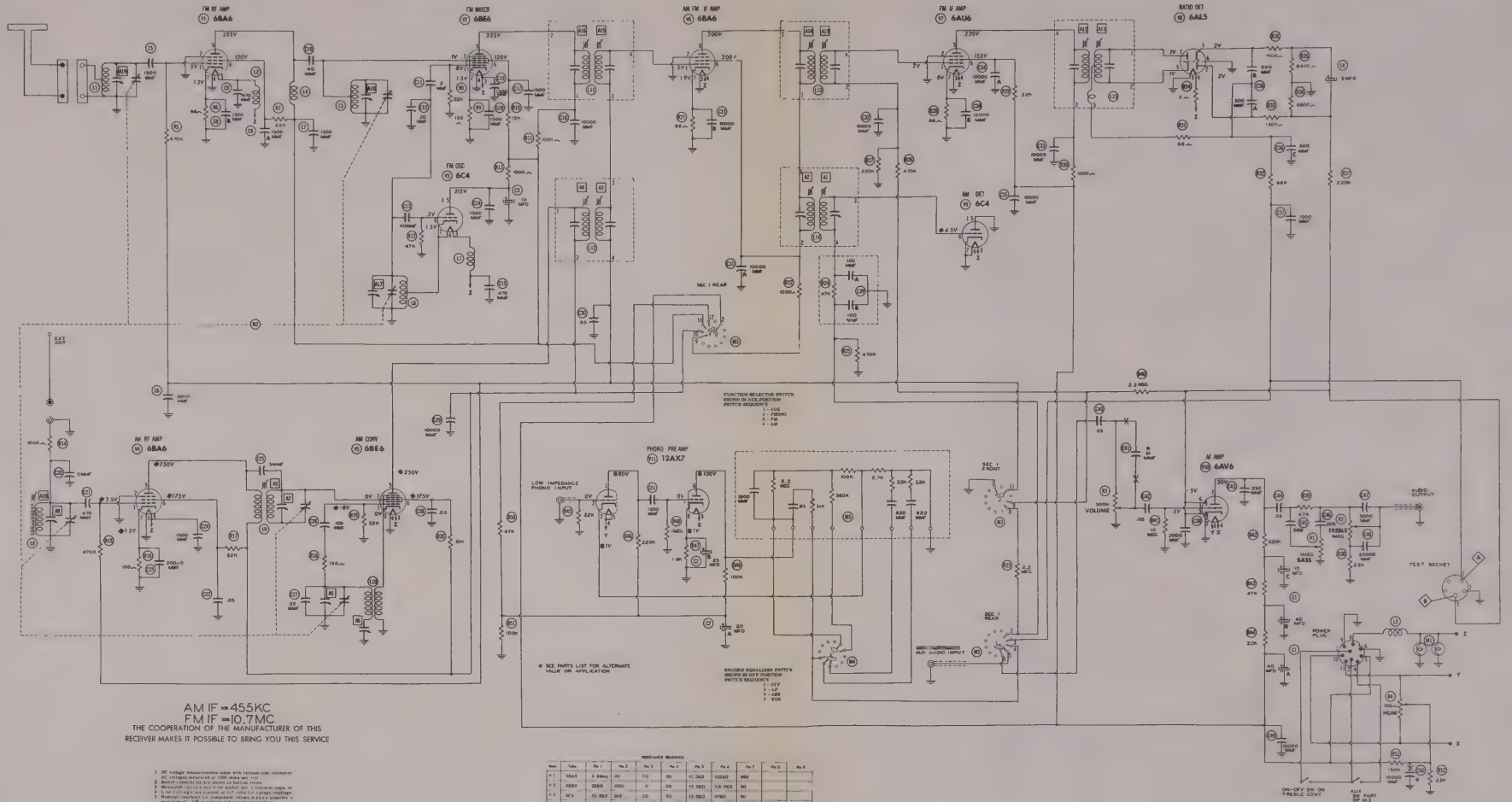
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



AM IF = 455KC
FM IF = 10.7MC
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1 DC voltage measurements taken with vacuum tube voltmeter
2 AC voltages measured at 1000 ohms per volt
3 Socket connections are shown as bottom views
4 Unmarked capacitors are ceramic or mylar
5 Unmarked resistors are 1/2 watt carbon
6 Nominal variation in component values is ± 20% unless a specific variation of ± 5% in voltage and resistance readings
7 Volume control at maximum - no signal applied for voltage measurements

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BA6	3 .35Meg	00	70	80	91 OHMS	93OHMS	680		
V 2	6BE6	22KΩ	150Ω	0	80	97 OHMS	96 OHMS	90		
V 3	6C4	93 OHMS	0HM	30	90	92 OHMS	47KΩ	0Ω		
V 4	6BA6	91.2MEG	80	00	30	940 OHMS	940OHMS	180Ω		
V 5	6BE6	22KΩ	31Ω	30	80	940 OHMS	940 OHMS	2.5Ω		
V 6	12AX7	190KΩ	0Ω	0Ω	80	93 OHMS	95 OHMS	850		
V 7	6AU6	220KΩ	0Ω	0Ω	30	93 OHMS	93OHMS	680		
V 8	6AL5	3 .5MΩ	8 .2MΩ	0Ω	1.3Ω	0HM	0Ω	0HM		
V 9	6C4	0Ω	0HM	30	0Ω	80	50OHMS	0Ω		
V 10	6AV6	1MEG	0Ω	250Ω	250Ω	220KΩ	220KΩ	150KΩ		
V 11	12AX7	1.2MEG	250Ω	2.7KΩ	270Ω	270Ω	1.6MEG	1.4MEG	250Ω	

READINGS TAKEN IN FM POSITION UNLESS NOTED
1 MEASURED FROM PIN 9 OF V10
2 MEASURED IN AM POSITION
3 MEASURED IN PHONO POSITION

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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245-3

SCHEMATIC—MODEL 400

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Speaker and amplifier should be connected for normal operation throughout entier alignment procedure.
With tuning gang fully closed set pointer to the last index mark (small gold line) to the left of "55" on the dial.
Allow a 15 minute warm-up period for receiver and test equipment.
Set treble and base controls to maximum clockwise position.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

AM ALIGNMENT

Attenuate signal generator output to maintain 0.5 watt indication (approximately 1.4 volts across 4Ω speaker terminal and 2 volts across 8Ω speaker terminals).

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to pin 1 (grid) of 6BA6 (V6). Low side to chassis.	455KC (400∿Mod)	AM	Tuning gang fully open	Across voice coil	A1, A2	Adjust for maximum deflection.
2.	"	High side to pin 7 (grid) of 6BE6 (V5). Low side to chassis.	"	"	"	"	A3, A4	"
3.	5MMF	High side to AM antenna input socket. Low side to chassis.	1700KC	"	1700KC	"	A5	"
4.	"	"	550KC	"	550KC	"	A6	Adjust for maximum deflection. Repeat steps 3 and 4 until correct oscillator tracking is obtained.
5.	"	"	1550KC	"	Tune to 1500KC signal	"	A7, A8	Adjust for maximum deflection.
6.	"	"	600KC	"	Tune to 600KC signal	"	A9, A10	Adjust for maximum deflection. Repeat steps 5 and 6 until correct RF tracking is obtained.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7.	.01MFD	High side to Pin 1 (grid)of 6AU6 (V7). Low side to chassis.	10.7MC (Unmod)	FM	Point of non-interference	DC probe to point (A). Common to chassis.	A11	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
8.	"	"	"	"	"	DC probe to point (B). Common to chassis.	A12	Adjust for maximum deflection. Repeat step 7 and 8.
9.	"	High side to pin 1 (grid) of 6BA6 (V6). Low side to pin 7.	"	"	"	"	A13,A14	Attenuate generator output to maintain -1.5 volts at VTVM. Adjust for maximum deflection.
10.	"	High side to pin 7 (grid) of 6BE6 (V5). Low side to chassis.	"	"	"	"	A15,A16	"

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
7.	.01MFD	High side to pin 7 (grid) of 6BE6 (V5). Low side to chassis.	10.7MC (450KC Swp)	FM	Point of non-interference	Vert. Amp. to point (B). Low side to chassis.	A12, A13, A14, A15, A16	Disconnect stabilizing capacitor C4. Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
8.	"	"	"	"	"	Vert. Amp. to point (A). Low side to chassis.	A11	Reconnect stabilizing capacitor C4. Adjust so that 10.7MC occurs at center of crossover lines as in Fig. 2. SLIGHTLY retouch A12 for maximum amplitude and straightness of crossover lines. Continue alignment with step 11.

FM RF ALIGNMENT

Attenuate signal generator output to maintain -1.5 volts at VTVM.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
11.	270Ω Carbon Resistor	Across FM antenna input socket (270Ω in high side)	106MC (Unmod)	FM	108MC	DC probe to point (B). Common to chassis.	A17	Adjust for maximum deflection.
12.	"	"	88MC	"	88MC	"		Use tuning wand to check L6. If necessary, adjust for maximum deflection by compressing or expanding coil turns . Repeat steps 11 and 12 until correct oscillator tracking is obtained.
13.	"	"	106MC	"	106MC	"	A18, A19	Adjust for maximum deflection.
14.	"	"	90MC	"	90MC	"		Use tuning wand to check L5 and L1 . If necessary, adjust L5 and L1 for maximum deflection by compressing or expanding coil turns. Repeat steps 13 and 14 until correct RF tracking is obtained.

HUM BALANCE ADJUSTMENT

Allow tuner to warm-up for at least 10 minutes with record player disconnected and perform the following operations.

(a) Set function switch to "phono" position.
(b) Set volume control fully clockwise.
(c) Set record equalizer to "AES" position.
(d) Reverse AC line plug and leave position that gives LEAST HUM.
(e) Adjust hum balance control (R4A) for MINIMUM background noise and residual hum.

FIG. 1

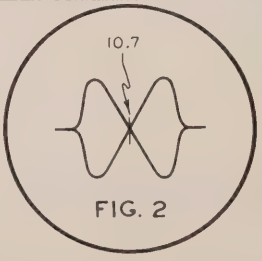
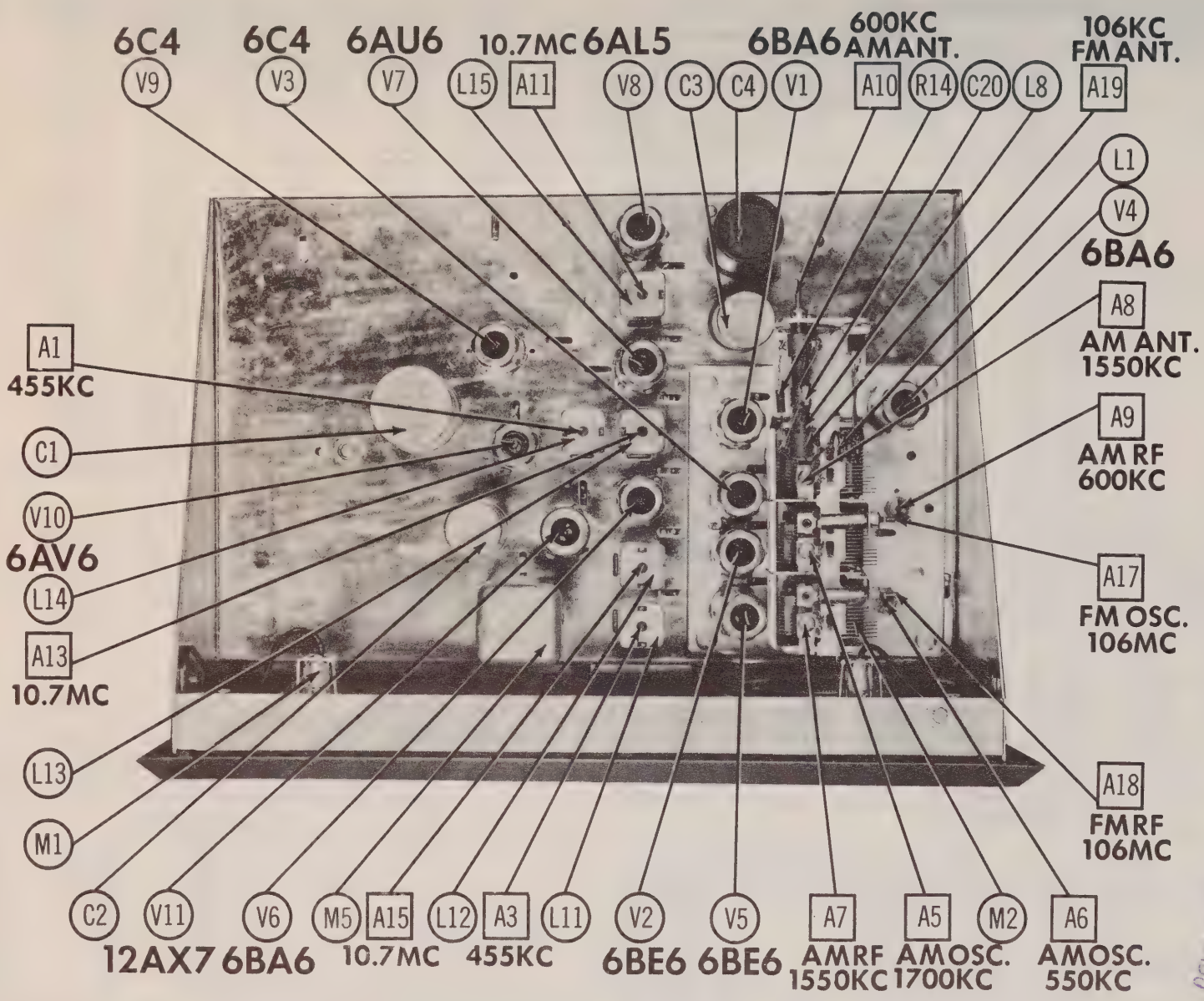


FIG. 2



MODEL 400 - CHASSIS TOP VIEW

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PARTS LIST AND DESCRIPTIONS MODEL 400

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: ESPEY PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	FM RF Amplifier	6BA6	6BA6	7BK	
V2	FM Mixer	6BE6	6BE6	7CH	
V3	FM Oscillator	6C4	6C4	6BG	
V4	AM RF Amplifier	6BA6	6BA6	7BK	
V5	AM Converter	6BE6	6BE6	7CH	
V6	1st. AM FM IF Amp	6BA6	6BA6	7BK	
V7	2nd. FM IF Amp.	6AU6	6AU6	7BK	
V8	Ratio Detector	6AL5	6AL5	6BT	
V9	AM Detector	6C4	6C4	6BG	
V10	AF Amplifier	6AV6	6AV6	7BT	
V11	Phono Pre-Amp.	12AX7	12AX7	9A	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	ESPEY PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	450		AFH3-43		C034		FP376.8	TVL-3785	
B	■40	450								
C	▲10	450								
C2A	■20	450		AFH3-36		B050		FP234	TVL-3749	
B	▲25	50						TC30		
C3	10	450		AFH1-48		A043		FP143	TVL-1705	
C4	5	250		PRS250/4		BR425		TC50X	TVA-1501	
C5	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C6	3000			SI3000	D6-302	TP60	GP2-333-302	UC-523	5HK-D3	
C7	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C8A	1500			BPD-2X0015	DD2-152	DK071	812-0015	DCD-5215	5HK-2D15	
B	1500									
C9	470			BPD-00047	D6-471	K060	801-471	UC-5347	5GA-T47	
C10	40									
C11	2									
C12	20									
C13	40									
C14	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C15	470			BPD-00047	D6-471	K060	801-471	UC-5347	5GA-T47	
C16	10000			BPD-01	DD-103	K080	811-01	DC-511	5HK-S1	
C17	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C18	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C19	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C20	5			SI5NP0	TCZ-4.7	TZ07	NP0K-050	ZT-555	5TCCB-V47	
C21	470			BPD-00047	D6-471	K060	801-471	UC-5347	5GA-T47	
C22	.05	400		P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C23	20000			BPD-02	DF-203	K085	817-02		5HK-S2	
C24	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C25	5			SI5NP0	TCZ-4.7	TZ07	NP0K-050	ZT-555	5TCCB-V47	
C26	100			SI100NP0	TCZ-100	TZ30	NP0-333-101	ZT-531	5TCC-T1	
C27	20			SI20NP0	TCZ-20	TZ13	NP0K-200	ZT-542	5TCC-Q2	
C28	.05	400		P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C29	10000			BPD-01	DD-103	K080	811-01	DC-511	5HK-S1	
C30	.05	200		P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C31A	10000			BPD-2X01	DD3-103	DK-082	811-01	DC-511	5HK-2S1	
B	10000						811-01			
C32	10000			BPD-01	DD-103	K080	811-01	DC-511	5HK-S1	
C33	10000			BPD-01	DD-103	K080	811-01	DC-511	5HK-S1	
C34A	10000			BPD-2X01	DD3-103	DK082	811-01	DC-511	5HK-S1	
B	10000						811-01	DC-511		
C35	10000			BPD-01	DD-103	K080	811-01	DC-511	5HK-S1	
C36A	300			SI300	D6-301	TP42	GP2K-301	UC-533	5GA-T3	
B	300			SI300	D6-301	TP42	GP2K-301	UC-533	5GA-T3	
C	300			SI300	D6-301	TP42	GP2K-301	UC-533	5GA-T3	
C37	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C38	2000			SI2000	D6-202	TP56	GP2-333-202	UC-522	5HK-D2	
C39A	100			♦PA-97	♦PC-50	♦111TM1	♦1403-01	UC-531	♦100C1	
B	100							UC-531		
C40	.05	200		P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C41	51			SI50	D6-500	TP30	GP1K-500	UC-545	5GA-Q5	Note 1
C42	.05	200		P288-05	DF-503	PJ2S5		PT415	2TM-S5	

PARTS LIST (Continued) MODEL 400

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	ESPEY PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C43	250	500		1468-00025	D6-251	5W5T25	GP2K-251	MC240	1FM-325	
C44	.05	600		P688-05	DF-503	CUB6S5		PT615	6TM-S5	
C45	.006	600		P688-006	D6-602	CUB6D6	GP2-333-602	PT626	6TM-D6	
C46	.005	600		P688-005	D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5	
C47	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C48	20000			BPD-02	DF-203	K085	817-02	PT412	5HK-S2	
C49	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C50	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	Note 1
C51	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	

Note 1. Not used in all models.
♦ Items C39A, C39B and R24 are combined in one unit.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	ESPEY PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1 Meg	½	A9.317-A	Q13-137	A47-1Meg-Z	B-70-S	U-53	Treble
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWE-12	Not Req.	US-26	Attach to R1A
R2A	1 Meg	½	A9.316-A	Q11-137	A47-1 Meg-S	B-69	U-54	Bass
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A
R3	500KΩ	½	A9.311-A					Volume & switch
R4A	100Ω	½	A9.310-A	W-100	A43-100	VK-121	R100L	Hum balance
B	Shaft		Not Req.	RQ	FKS-1/4	Not Req.	Not Req.	Attach to R4A

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	ESPEY PART No.	IRC PART No.	NOTES
R5	470KΩ	½		BTS-470K	
R6	68Ω	½		BTS-68	
R7	22KΩ	1		BTA-22K	
R8	22KΩ	½		BTS-22K	
R9	150Ω	½		BTS-150	
R10	15KΩ	2		BTB-15K	
R11	1000Ω	½		BTS-1000	
R12	47KΩ	½		BTS-47K	
R13	1000Ω	½		BTS-1000	
R14	1000Ω	½		BTS-1000	
R15	470KΩ	½		BTS-470K	
R16	100Ω	½		BTS-100	
R17	22KΩ	1		BTA-22K	
R18	150Ω	½		BTS-150	
R19	22KΩ	½		BTS-22K	
R20	15KΩ	2		BTB-15K	
R21	68Ω	½		BTS-68	
R22	1000Ω	½		BTS-1000	
R23	2.2 Meg	½		BTS-2.2Meg	
R24	47KΩ	½	♦	BTS-47K	
R25	470KΩ	½		BTS-470K	
R26	470KΩ	½		BTS-470K	
R27	220KΩ	½		BTS-220K	
R28	68Ω	½		BTS-68	
R29	22KΩ	1		BTA-22K	

ITEM No.	RATING OHMS	RATING WATT	ESPEY PART No.	IRC PART No.	NOTES
R30	1000Ω	½		BTS-1000	
R31	68Ω	½		BTS-68	
R32	68KΩ	½		BTS-68K	
R33	1500Ω	½		BTS-1500	
R34	6800Ω	½		BTS-6800	
R35	6800Ω	½		BTS-6800	
R36	1000Ω	½		BTS-1000	
R37	220KΩ	½		BTS-220K	
R38	22KΩ	½		BTS-22K	
R39	47KΩ	½		BTS-47K	
R40	2.2 Meg	½		BTS-2.2Meg	
R41	10 Meg	½		BTS-10 Meg	
R42	220KΩ	½		BTS-220K	
R43	47KΩ	½		BTS-47K	
R44	22KΩ	½		BTS-22K	
R45	22KΩ	½		BTS-22K	
R46	220KΩ	½		BTS-220K	
R47	1800Ω	½		BTS-1800	
R48	1 Meg	½		BTS-1 Meg	
R49	100KΩ	½		BTS-100K	
R50	47KΩ	½		BTS-47K	
R51	100KΩ	½		BTS-100K	
R52	22KΩ	½		BTS-22K	
R53	150KΩ	½		BTS-150K	
R54	2Ω	1			

♦ Items R24, C39A, C39B. are combined in one unit.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	ESPEY PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	FM Ant. Coil	0Ω (tapped)		A2.241				
L2	Fil. Choke	.4Ω		2.703	19-1001	TV-189	4604	1.5 Microhenries (IRC part #CLA)
L3	Fil. Choke	.1Ω		2.702	19-1001	TV-189	4604	1.5 Microhenries (IRC part # CL-1)

(CONT'D ON NEXT PAGE)

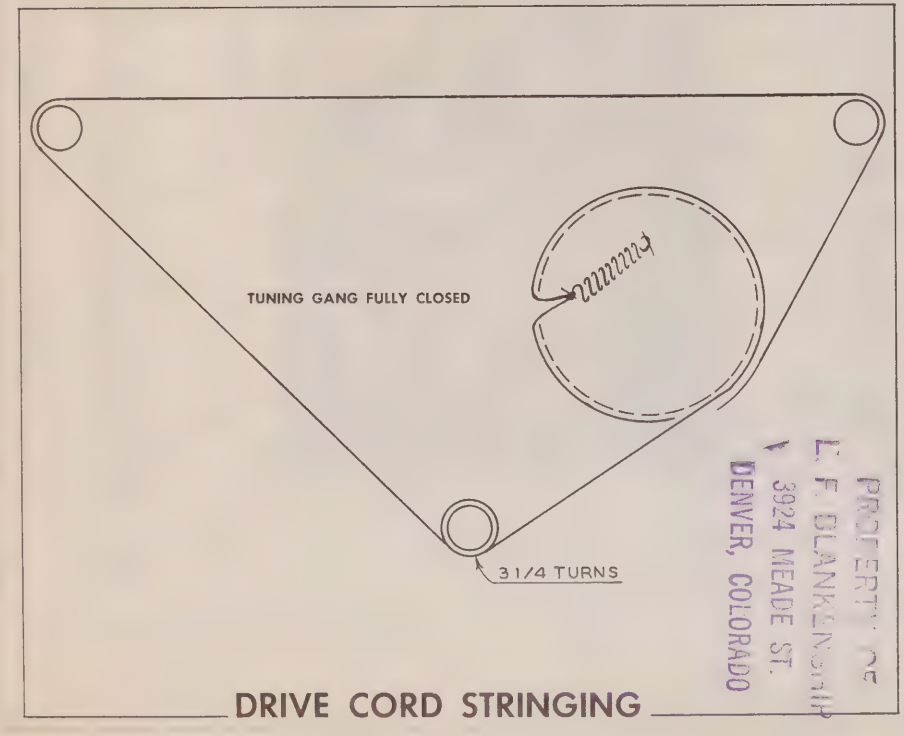
PARTS LIST (Continued) MODEL 400

COILS (cont)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA ESPEY PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L4	FM RF Choke	1.1Ω		B2.402	19-1002		4606	3 Microhenries
L5	FM RF Coil	0Ω (tapped)		A2.580				
L6	FM Osc. Coil	0Ω (tapped)		A2.581				
L7	Fil. Choke	.4Ω		2.703	19-1001	TV-189	4604	1.5 Microhenries (IRC part #CLA)
L8	AM Ant. Coil	1.1Ω		2.699			6300	
L9	AM RF Coil	100Ω	2.4Ω	B2.409	14-1072	BC-382	A-5495-RF	
L10	AM Osc. Coil	.8Ω	7Ω	B2.410	14-1074	BC-397	70-Osc.	
L11	1st. FM IF	.7Ω	.7Ω	2.415	16-3487	FM-254	1463	
L12	1st. AM IF	9.5Ω	9.5Ω	2.414	16-6758	BC-352	12-C1	
L13	2nd. FM IF	.7Ω	.7Ω	2.415	16-3487	FM-254	1463	
L14	2nd. AM IF	9.5Ω	9.5Ω	2.414	16-6758	BC-353	12-C2	
L15	Ratio Det.	1.6Ω	1ΩCT	2.474	17-3488 †	1465	FM-255	Tertiary winding -.5Ω

MISCELLANEOUS

ITEM No.	PART NAME	ESPEY PART No.	NOTES
M1	Dial light		(2) # 47
M2	Tuning cap	B6.070	(28-515MMF) (39-525MMF) (33-512MMF)
M3	Switch		Function selector
M4	Switch		Record equalizer
M5	Network		Record equalizer
A6	Trimmer cap	C13.518	A. M. Osc. padder (500-100MMF)



DRIVE CORD STRINGING

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PARTS LIST AND DESCRIPTIONS MODEL 500

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA ESPEY PART No.	REPLACEMENT DATA STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V12	AF Amplifier	6J5	6J5	6Q	
V13	Phase Inverter	6J5	6J5	6Q	
V14	Audio Output	6V6GT	6V6GT	7S	
V15	Audio Output	6V6GT	6V6GT	7S	
V16	Audio Output	6V6GT	6V6GT	7S	
V17	Audio Output	6V6GT	6V6GT	7S	
V18	Rectifier	5Y3GT	5Y3GT	5T	
V19	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	ESPEY PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C52A	▲40	450		AFH3-43		C034		FP376.8	TVL-3785	
B	■40	450								
C	▲10	450								
C53A	▲10	450		AFH3-43		C034		FP376.8	TVL-3785	
B	■40	450								
C	▲40	450								
C54	50	50		AFH1-18		A020		FP115	TVL-1415	
C55A	■50	50		AFH2-06		B008		FP214	TVL-2320	
B	▲50	50								
C56	.05	400		P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C57	.05	400		P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C58	1500	1500		HVD15-0015			1R5KV-152	MCK215		
C59	1500	1500		HVD15-0015			1R5KV-152	MCK215		
C60	.05	400		489ZX-05		CUB4S5		PT415	4TM-S5	

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA ESPEY PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R55	470KΩ	½		BTS-470K	
R56	4700Ω	½		BTS-4700	
R57	10Ω	1			
R58	100Ω	1½		BTS-100	
R59	47KΩ	½		BTS-47K	
R60	4700Ω	½		BTS-4700	
R61	220KΩ	½		BTS-220K	
R62	220KΩ	½		BTS-220K	
R63	47KΩ	½		BTS-47K	
R64	47KΩ	½		BTS-47K	
R65	39Ω	½		BTS-39	

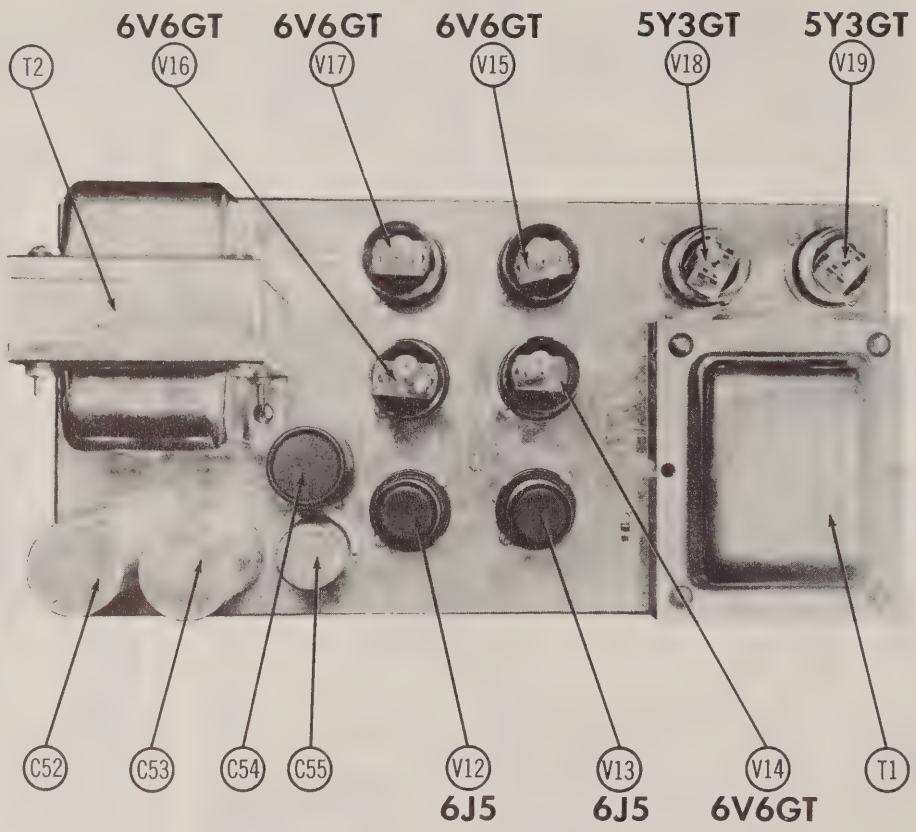
ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA ESPEY PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R66	39Ω	½		BTS-39	
R67	180KΩ	½		BTS-180K	
R68	4000Ω	10	14.088		
R69	130Ω	10	14.089		
R70	39Ω	½		BTS-39	
R71	39Ω	½		BTS-39	
R72	220KΩ	½		BTS-220K	
R73	4000Ω	10	14.088		
R74	220Ω	10			
R75	730Ω	15			
R76	730Ω	15			

TRANSFORMER (POWER)

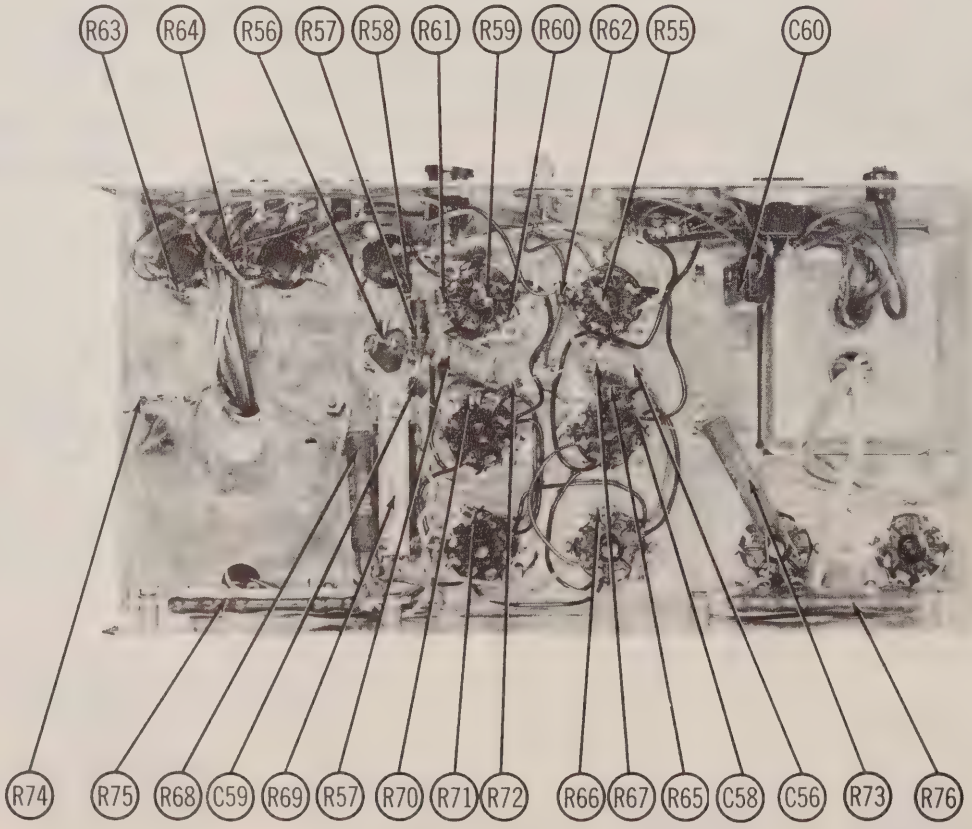
ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA ESPEY PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @ 1.35A.	610VCT .200ADC	5VAC @ 4 A.	6.3VAC @ .59A. SEC. 4 6.3VAC 5.2A.	L18.128		P-3055			T-26R17

TRANSFORMER (AUDIO OUTPUT)

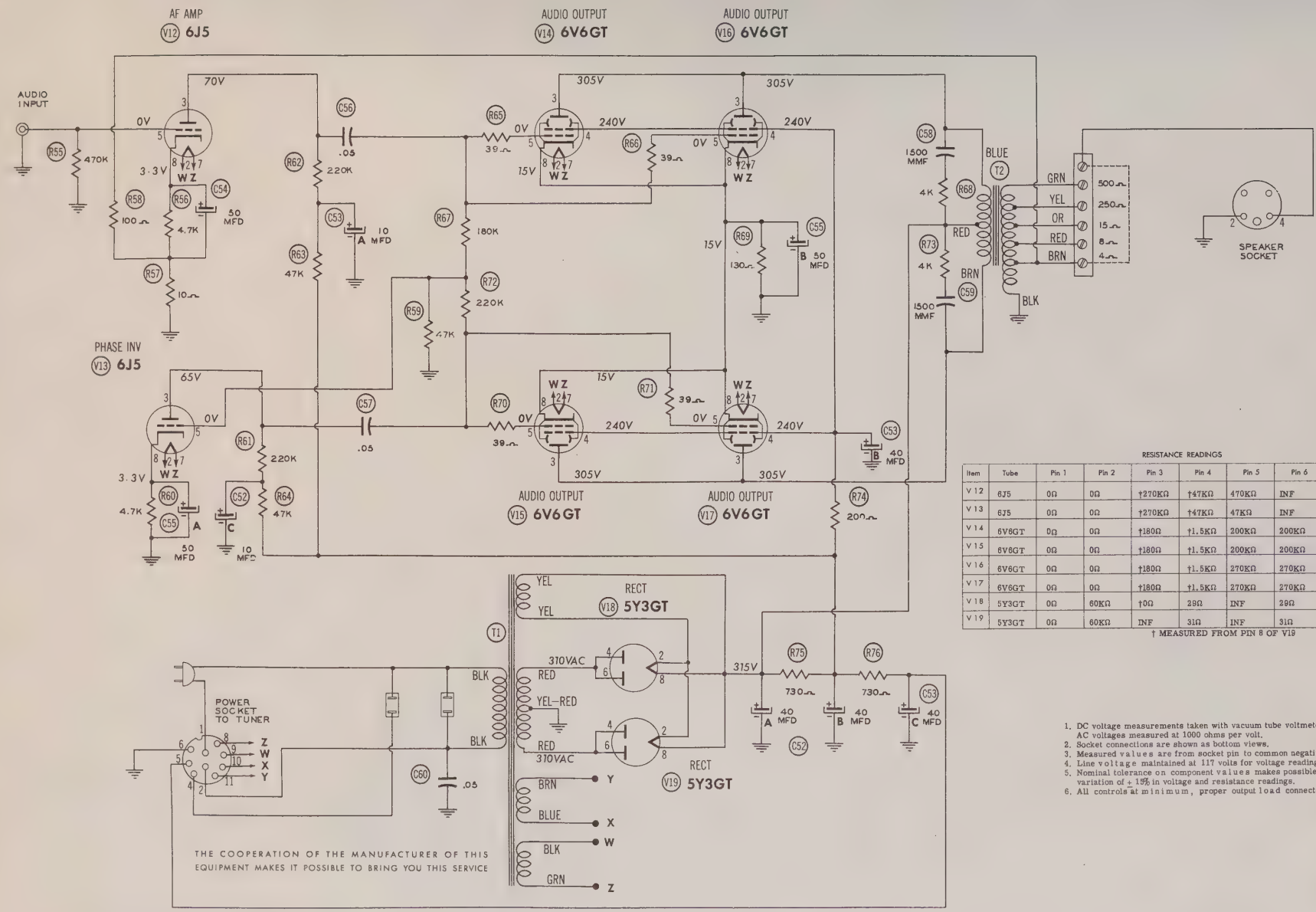
ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA ESPEY PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T2	4.1KΩ CT	500Ω tap @ 250Ω, 15Ω, 8Ω, 4Ω	B15.037	A-5528①	A-3129①	S-22A		T-22S78①	① Drill new mounting holes, use shield on old transformer. ② This unit does not have 250Ω tap.



MODEL 500-TOP VIEW



MODEL 500-BOTTOM VIEW



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 12	6J5	0Ω	0Ω	†270KΩ	†47KΩ	470KΩ	INF	.2Ω	4.7KΩ
V 13	6J5	0Ω	0Ω	†270KΩ	†47KΩ	47KΩ	INF	.2Ω	4.7KΩ
V 14	6V6GT	0Ω	0Ω	†180Ω	†1.5KΩ	200KΩ	200KΩ	.2Ω	130Ω
V 15	6V6GT	0Ω	0Ω	†180Ω	†1.5KΩ	200KΩ	200KΩ	.2Ω	130Ω
V 16	6V6GT	0Ω	0Ω	†180Ω	†1.5KΩ	270KΩ	270KΩ	.2Ω	130Ω
V 17	6V6GT	0Ω	0Ω	†180Ω	†1.5KΩ	270KΩ	270KΩ	.2Ω	130Ω
V 18	5Y3GT	0Ω	60KΩ	†0Ω	29Ω	INF	29Ω	INF	60KΩ
V 19	5Y3GT	0Ω	60KΩ	INF	31Ω	INF	31Ω	INF	60KΩ

† MEASURED FROM PIN 8 OF V19

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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245-3

SCHEMATIC—MODEL 500

PHOTOFACT* Folder

RETMA MEMBER

PHILHARMONIC MODELS 920, 924, 9120, 9121, 9820, 9821

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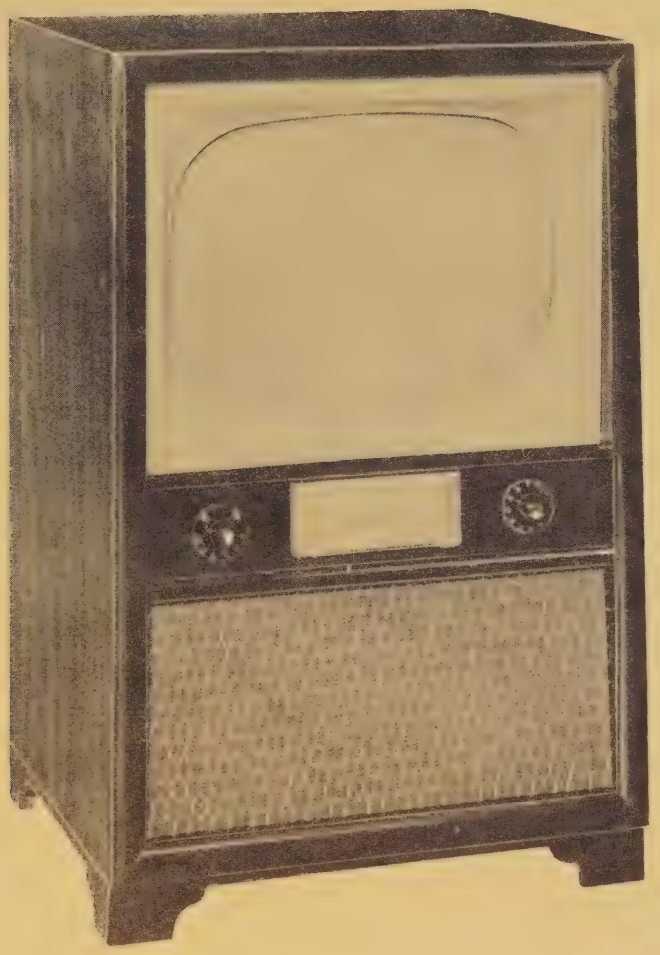

MODEL 9121

PHILHARMONIC MODELS
920, 924, 9120, 9121, 9820, 9821

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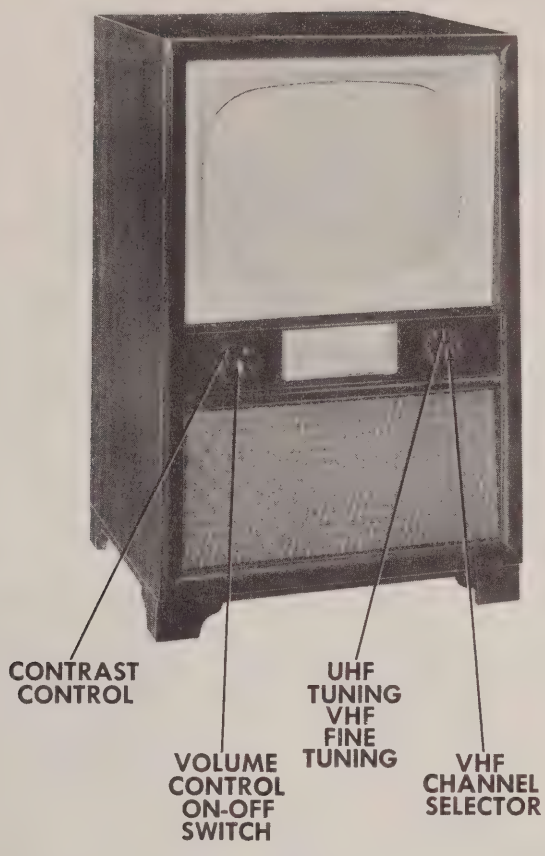

PHILHARMONIC MODEL 9121

TRADE NAME	Philharmonic Models 920, 924, 9120, 9121, 9820, 9821
MANUFACTURER	Philharmonic Radio & Television Corp., 235 Jersey Ave., New Brunswick, N.J.
TYPE SET	Television Receiver
TUBES	Twenty-one
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING 1.74 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF. Video IF 25.75MC, Sound IF 21.25MC (Intercarrier)

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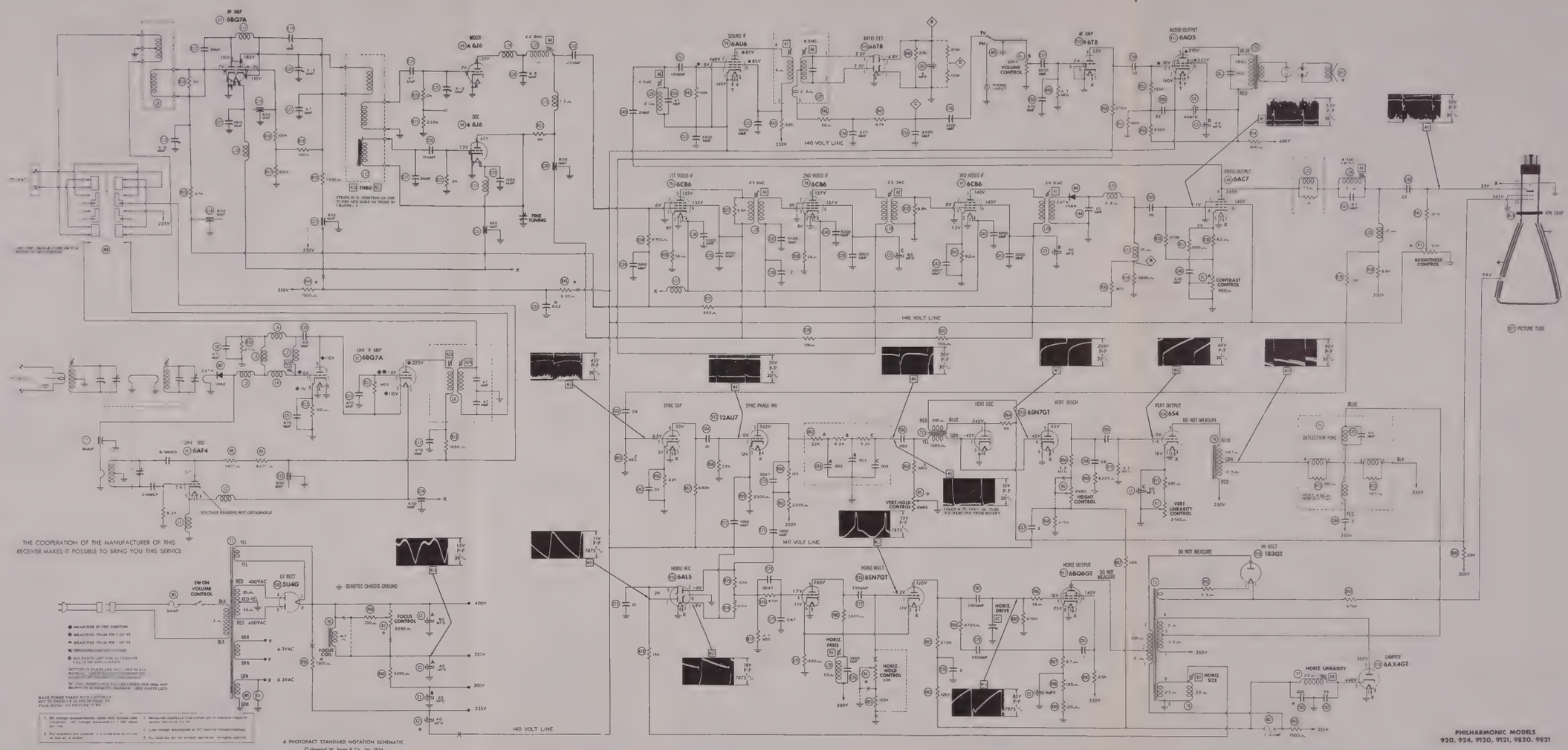
PHILHARMONIC MODELS
920, 924, 9120, 9121, 9820, 9821



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MODELS 920, 924, 9120, 9121, 9820, 9821

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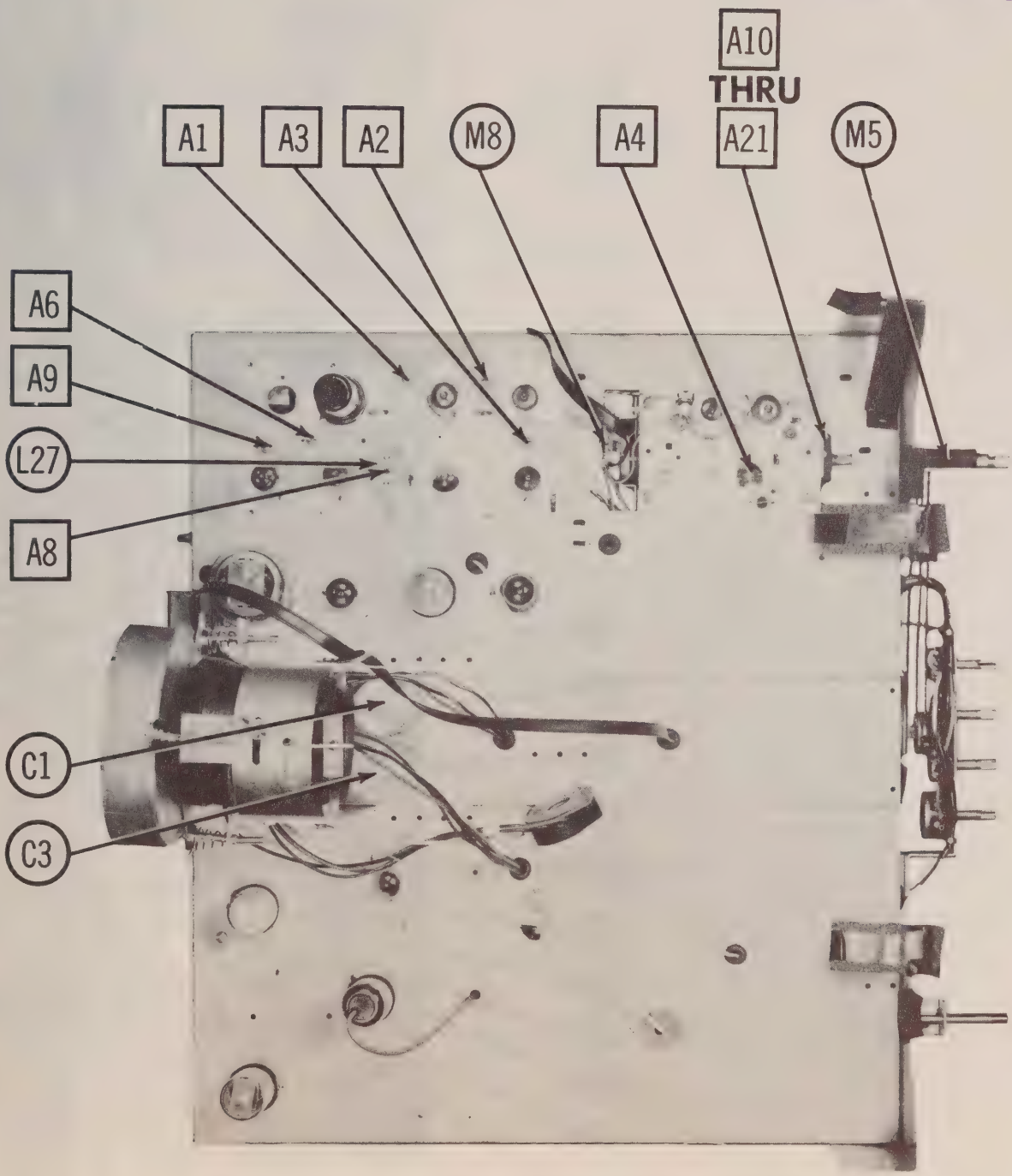

CHASSIS TOP VIEW

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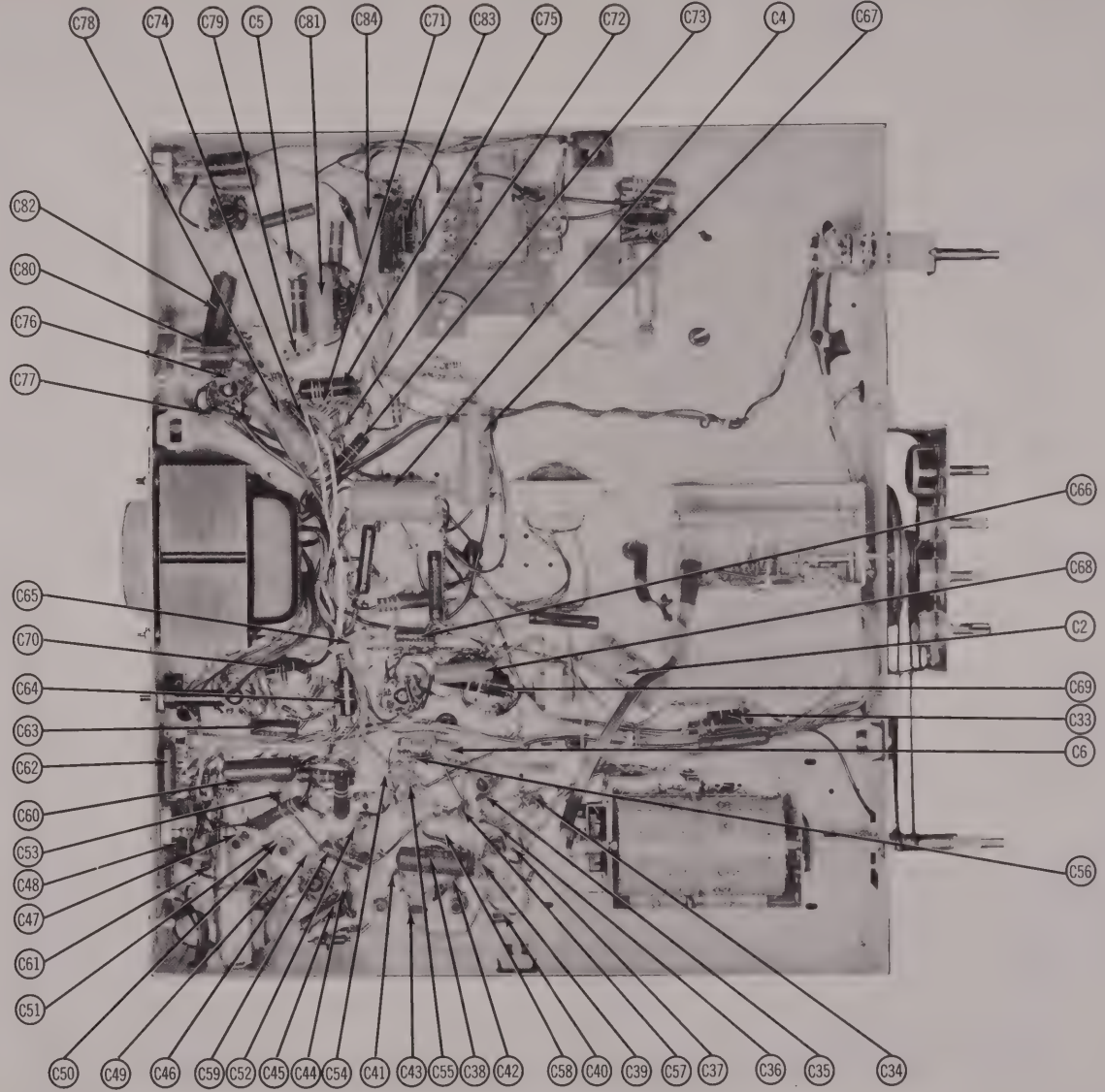

CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

TUBE PLACEMENT CHART

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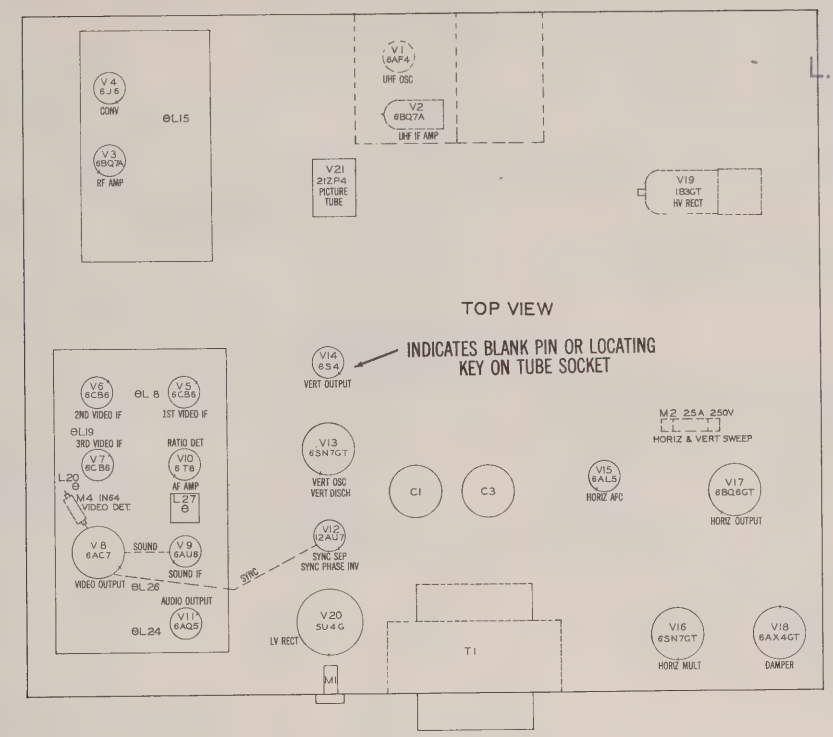


TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V20, Fuse (M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V4, V5, V6, V7, V8, V11 (V1, V2 UHF only)
No pic, no sound, has snow - V3, V4, V5
No pic, has sound, has raster - V8, V21
Has pic, no sound -V9, V10, V11

SYNC FAILURE
No vert. sync - V12, V13
No horiz. sync - V12, V15, V16
No vert. or horiz. sync - V12

SWEEP FAILURE
No raster, has sound - V16, V17, V18, V19, V21, Fuse (M2)
No vertical deflection - V13, V14
Poor vert. linearity or foldover - V13, V14
Poor horiz. linearity or foldover -V16, V17, V18
Narrow picture - V16, V17, V18, V19
Vert. off freq. - V12, V13
Horiz. off freq. -V12, V15, V16

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis.

VIDEO IF ALIGNMENT

Remove the converter tube (V4) from its socket and replace with a 6J6 which has pin 1 removed .

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	24.6MC (Unmod)	Any	DC probe to point (A). Common to chassis.	A1	Adjust for maximum deflection. Attenuate generator output to maintain not more than -1.5 volts at VTVM.
2.	"	"	23.3MC	"	"	A2	"
3.	"	"	25.6MC	"	"	A3	"
4.	"	"	22.8MC	"	"	A4	"
5.	"	"	21.25MC	"	"	A5	Sets that do not use the cascode tuner employ a 21.25MC trap (A5). This trap (A5) should be adjusted for MINIMUM deflection.

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Direct	High side to ungrounded tube shield floating over dummy converter tube. Low side to chassis.	24MC (10MC Swp)	21.25MC 22.5MC 23.25MC 25.75MC	Any	Vert. Amp. to point A . Low side to chassis.		Check for response curve similar to Fig.1. The 22.5MC and 25.75MC markers should be at 50% response. If necessary, retouch A1 thru A4 to obtain desired response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in series from point (B) to chassis. The junction of these two resistors is alignment point (D) .as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	.01MFD	High side to pin 4 (grid) of 6AC7 (V8). Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point (B) Common to chassis.	A6, A7	Adjust for maximum deflection.
8.	"	"	"	"	DC probe to point (C) Common to point (D).	A8	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	.01MFD	High side to pin 4 (grid) of 6AC7 (V8). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. to point (B) . Low side to chassis.	A6, A7	Disconnect stabilizing capacitor C6. Adjust for curve of maximum amplitude and symmetry similar to Fig. 2.
8.	"	"	"	"	"	Vert. Amp. to point (C). Low side to chassis.	A8	Reconnect stabilizing capacitor C6. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 2. SLIGHTLY retouch A7 for maximum amplitude and straightness of crossover lines.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	.01MFD	High side to pin 4 (grid) of 6AC7 (V8). Low side to chassis.	4.5MC (Unmod)	Any	DC probe thru detector (Fig.4) to pin 11 (cathode) of picture tube. Low side to chassis.	A9	Adjust for MINIMUM deflection.

OSCILLATOR ALIGNMENT

The channel oscillator adjustment screws are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. to point (A). Low side to chassis.	A10	Video marker should be at 50% on response curve. Place sound marker as shown in Fig. 5.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A11	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A12	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A13	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A14	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A15	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A16	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A17	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A18	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A19	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A20	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A21	

RF AND MIXER ALIGNMENT

The RF and mixer portion of this receiver has been properly aligned at the factory and is very stable .
Alignment of this portion should not be required in the field.

ALIGNMENT INSTRUCTIONS (cont)

UHF TUNER ALIGNMENT

The following equipment is required for proper alignment:
1. A sweep generator with 30MC sweep at 82MC center frequency.
2. A signal generator with range of from 60MC to 100MC.
3. A good oscilloscope.

The following adaptors are required:
1. A balanced detector (Fig. 6).
2. A crystal simulator (Fig. 7).
3. A detector simulator (Fig.8).

When connecting adaptors use very short leads.
Remove the 1N82 crystal diode from its holding clips.
Connect the output of the signal generator to a small pickup loop to radiate the signal into the UHF converter
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CONNECT SCOPE	ADJUST	REMARKS
11.	Fig. 7.	Thru crystal simulator to 1N82 mounting clips as in Fig. 7.	82MC (30MC Swp)	95MC	Vert. Amp. thru detector (Fig.8) to pin 1 (plate) of 6BQ7A (V2). NOTE-Solder the detector lead to pin 1 terminal. Low side to chassis.	A22	Connect a short across secondary terminals 3 and 5 of L8. Adjust to place marker at 70% on high frequency side of response curve as in Fig. 9.
12.	"	"	"	69MC	"	L5, L3	Compress or expand L5 to place 69MC marker at 70% on response curve. If necessary, compress or expand L3 for symmetrical response as in Fig.9. Remove detector (Fig.8) from V2 and the short from L8.
13.	"	"	"	76MC 88MC	Vert. Amp. thru detector (Fig.6) to terminals 3 and 5 of L8.	A23, A24	Adjust for response curve similar to Fig. 10.

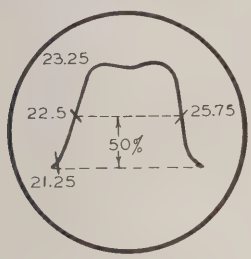


FIG.1

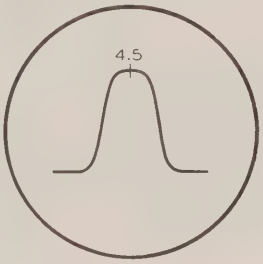


FIG.2

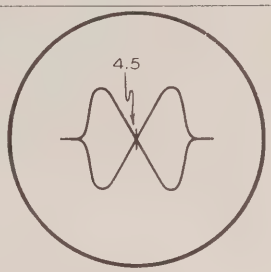


FIG.3

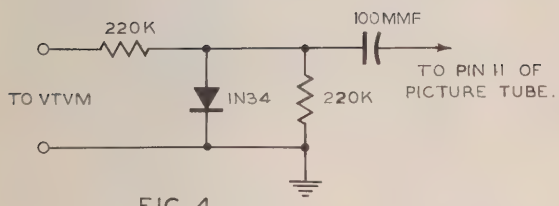


FIG.4

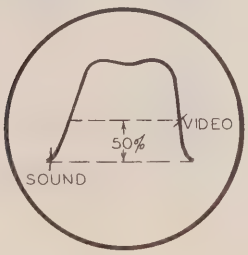


FIG.5

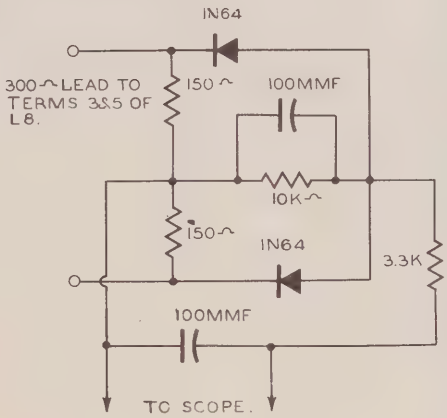


FIG.6

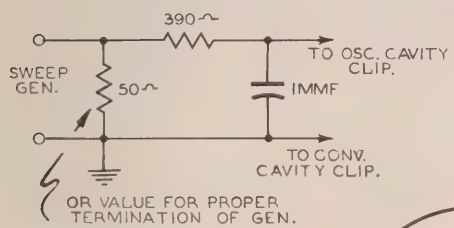


FIG.7

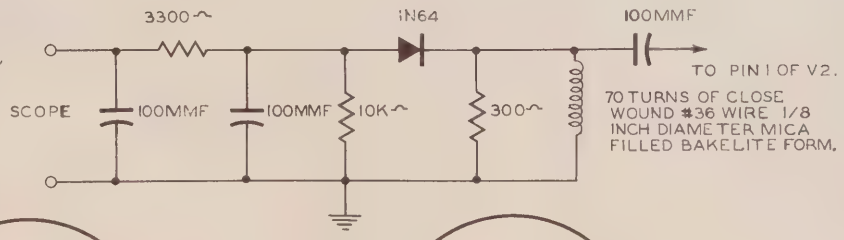


FIG.8

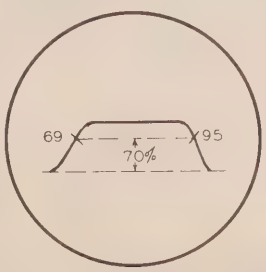


FIG.9

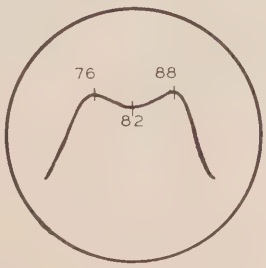
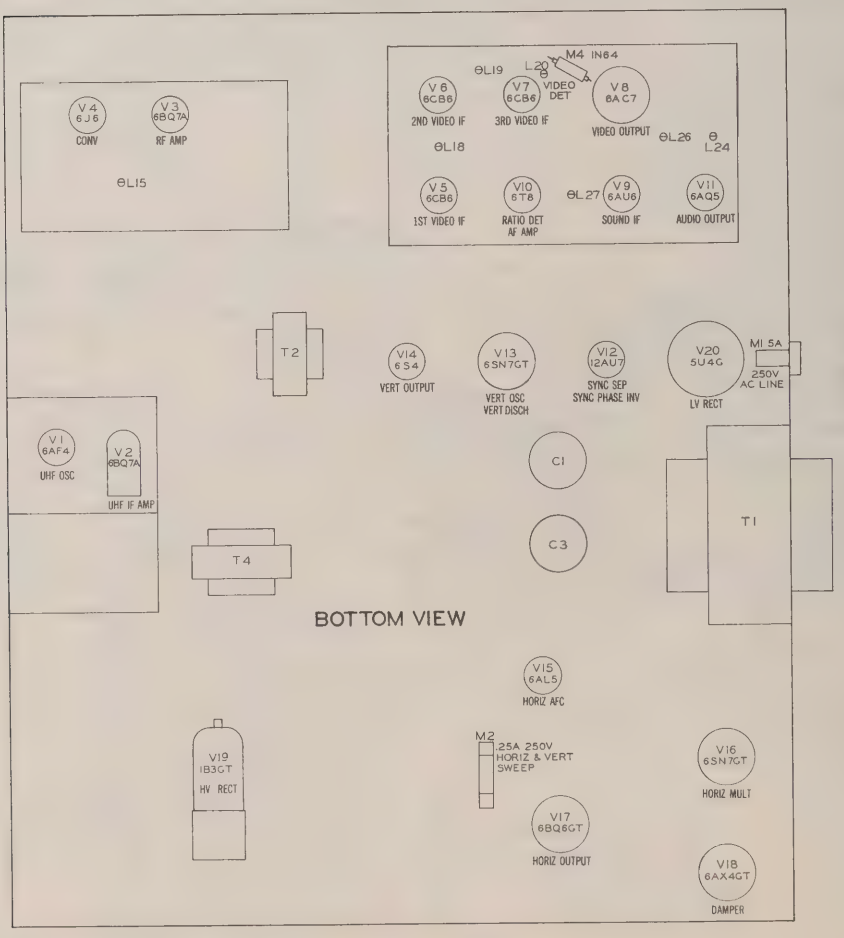


FIG.10

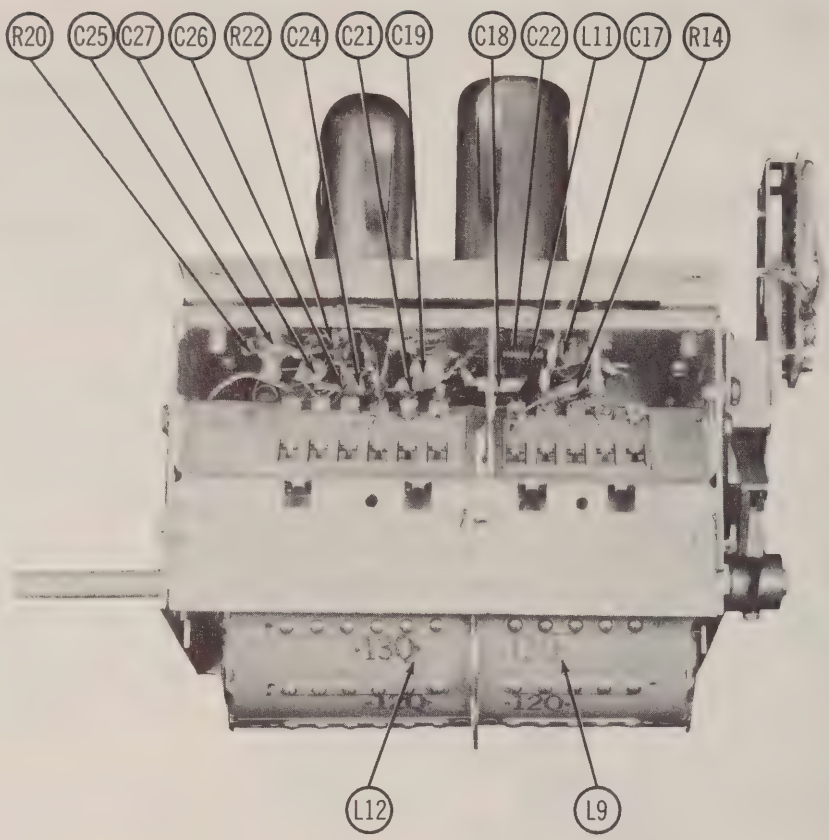
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AF4	†♦21. 3KΩ	8. 2KΩ	0Ω	.1Ω	0Ω	8. 2KΩ	†♦21. 3KΩ		
V 2	6BQ7A	†♦8. 5KΩ	INF	INF	0Ω	.1Ω	INF	27Ω	100Ω	0Ω
V 3	6BQ7A	INF	1. 1Meg	0Ω	.1Ω	0Ω	† 9. 2KΩ	180KΩ	INF	0Ω
V 4	6J6	▲ 15. 2KΩ	▲ 200Ω	.1Ω	0Ω	230KΩ	10KΩ	0Ω		
V 5	6CB6	1 Meg	56Ω	0Ω	.1Ω	▲ 200Ω	▲ 200Ω	0Ω		
V 6	6CB6	1 Meg	56Ω	0Ω	.1Ω	▲ 100Ω	▲ 100Ω	0Ω		
V 7	6CB6	.3Ω	82Ω	0Ω	.1Ω	▲ 0Ω	▲0Ω	0Ω		
V 8	6AC7	0Ω	0Ω	0Ω	470KΩ	160Ω	▲ 0Ω	.1Ω	† 10. 3KΩ	
V 9	6AU6	▲ 100KΩ	▲ 0Ω	▲ 0Ω	▲ .1Ω	† 22. 2KΩ	† 22. 2KΩ	▲ 0Ω		
V 10	6T8	INF	27KΩ	INF	0Ω	.1Ω	0Ω	0Ω	4. 7 Meg	▲ 270KΩ
V 11	6AQ5	230KΩ	25KΩ	▲ 0Ω	▲ .1Ω	† 1. 2KΩ	† 800Ω	230KΩ		
V 12	12AU7	† 17. 4KΩ	22KΩ	2. 2KΩ	.1Ω	.1Ω	▲ 680KΩ	1. 2 Meg	22KΩ	0Ω
V 13	6SN7GT	2. 7 Meg	▲22. 2KΩ	0Ω	2. 7 Meg	◓ 4. 5 Meg	0Ω	.1Ω	0Ω	
V 14	6S4	INF	1. 6 KΩ	2. 2 Meg	.1Ω	0Ω	2. 2 Meg	INF	INF	† 1. 2KΩ
V 15	6AL5	4. 8 Meg	4. 8 Meg	.1Ω	0Ω	15KΩ	0Ω	15KΩ		
V 16	6SN7GT	130KΩ	◓ 390KΩ	1. 5KΩ	5. 2Meg	† 9. 6KΩ	1.5KΩ	.1Ω	0Ω	
V 17	6BQ6GT	INF	.1Ω	INF	† 25KΩ	470KΩ	470KΩ	0Ω	267Ω	TOP CAP ◓ 43Ω
V 18	6AX4GT	INF	INF	† 8KΩ	INF	† 240Ω	INF	0Ω	.1Ω	
V 19	1B3GT	PINS 1-8 HAVE INF. RESISTANCE								TOP CAP ◓ 393Ω
V 20	5U4G	INF	35KΩ	INF	35Ω	INF	35Ω	INF	35KΩ	
V 21	21EP4	0Ω	0Ω	PIN 10 † 22. 2KΩ	PIN 11 ▲ 130KΩ	PIN 12 .1Ω				

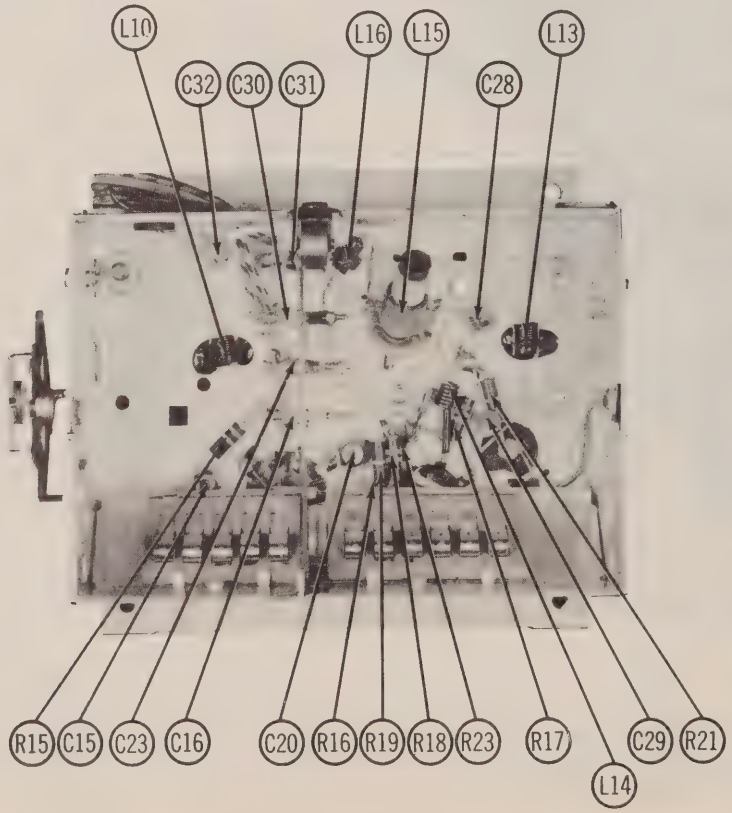
♦ MEASURED IN UHF POSITION.
† MEASURED FROM PIN 8 OF V20.
▲ MEASURED FROM 140 VOLT LINE.
◓ MEASURED FROM PIN 3 OF V18.



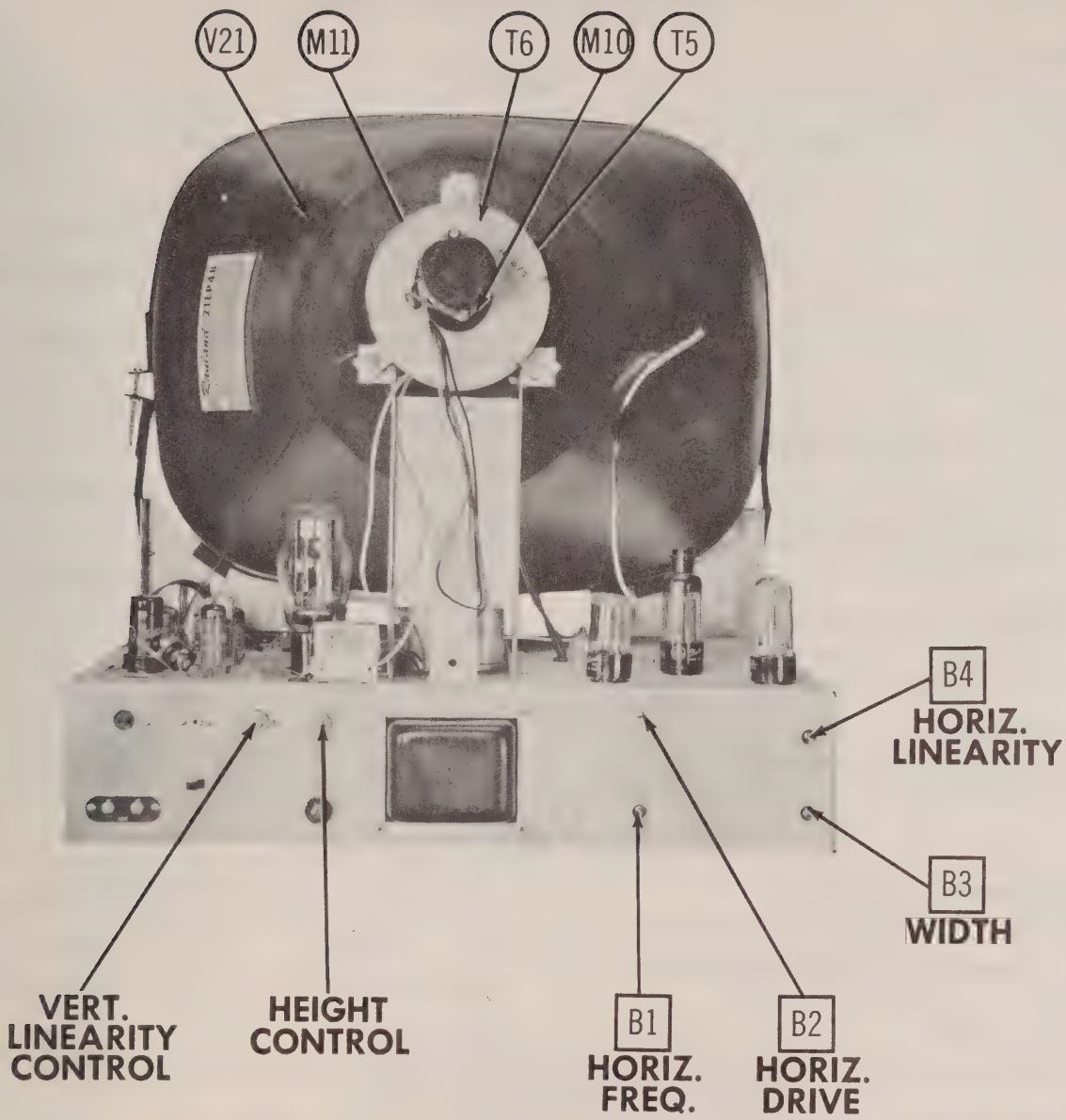
TUBE PLACEMENT CHART



VHF TUNER-RIGHT SIDE



VHF TUNER-BOTTOM VIEW



CHASSIS—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Turn the horizontal hold control to its mid-range position and adjust the horizontal frequency slug (B1) until the picture synchronizes synchronizes horizontally.

Adjust the horizontal drive trimmer (B2) clockwise as far as possible without the presence of vertical white lines or compression near the center of the picture.

Adjust the horizontal size slug (B3) for a picture slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity slug (B4) for a picture that is symmetrical from left to right.

A slight readjustment of B2 may be necessary to obtain optimum results.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V16, V17, V18 and V20. Check adjustments B2, B3 and B4. Check waveform W13.

If Satisfactory	If Unsatisfactory
Check T3, T5A, R90, C81, C84, C82, C83, R91 and other associated components.	Check R85, R82, R80, R79, C77, C80 and other associated components.

DRIVE LINES

Check adjustment B2. Check by substitution V16, V17 and V18. Check T3, T5A, C82, C83, C85, C79, C80, R84, R85 and other associated circuit components.

COMPRESSED LEFT SIDE

Check adjustments B2, B3, and B4. Check by substitution V16, V17 and V18. Check components associated with the horizontal output and damper stages especially T3 and T5A.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check C75 for open. Check V17, V18, T3, T5A, T7 and T8 for internal arcing.

XMAS TREE EFFECT

Substitute V16. Check adjustments B1 and B2. Check L28, C76, C77 and other associated components.

VERTICAL

LOSS OF SWEEP

Check by substitution V13 and V14. Check waveform W8.

If Satisfactory	If Unsatisfactory
Check T4, R5B, R71, R7 and other associated components.	Check R6, R66, R70, C69, T2 and other associated components.

INSUFFICIENT SWEEP

Check adjustment of height and vertical linearity controls. Proceed as outlined under "Loss of Sweep".

COMPRESSED AT BOTTOM

Check by substitution V13 and V14. Check T4, T5B, C1C and other associated circuit components.

COMPRESSED AT TOP

Check by substitution V13 and V14. Check T2, C68, C69, R66, R69, R70 and other associated components.

FOLDS

Check by substitution V13 and V14. Check associated components for failure or change of value.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Substitute V12. Check R55, R56, R59, R60, C62, C63, C64, C70 and other associated circuit components.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Check by substitution V12 and V13. Check waveform W5.

If Satisfactory	If Unsatisfactory
Check components associated with V13 especially T2 and R63.	Check vertical integrator and other associated components. Check the video and IF stages for overloading.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Check by substitution V15 and V16. Check waveform W10.

If Satisfactory	If Unsatisfactory
Check components associated with V16 especially C76 and C77.	Check C71, C72, R74 and R75.

HORIZONTAL BENDING

Check by substitution V15, V16 and V17. Check horizontal AFC filter network for component failure or change of value.

VIDEO

LOSS OF VIDEO

Substitute V8. Check video detector crystal and assembly. Check picture tube and components associated with V8.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best picture and sound. Check adjustment A9 and video IF alignment.

POOR CONTRAST

Substitute V8. Check video detector crystal. Check contrast control, picture tube and other associated circuit components.

NEGATIVE PICTURE

Check by substitution V8, V6, V5 and V3. Check video detector crystal. Check AGC network. Check picture tube.

SMEAR

Substitute V8. Check video detector crystal, C45, C48, R35, R38, R41, L21, L22, L23, L25, picture tube and other associated circuit components.

WIDE BLACK BAR ACROSS PICTURE

Check V3, V5, V6, V7 and V8 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V9, V10 and V11. Check stages V10B and V11 using audio signal generator. Apply audio signal across R49.

If Satisfactory	If Unsatisfactory
Check ratio detector and audio IF alignment and components.	Check R50, R51, R52, R53, C59, C61, T9 and other associated components.

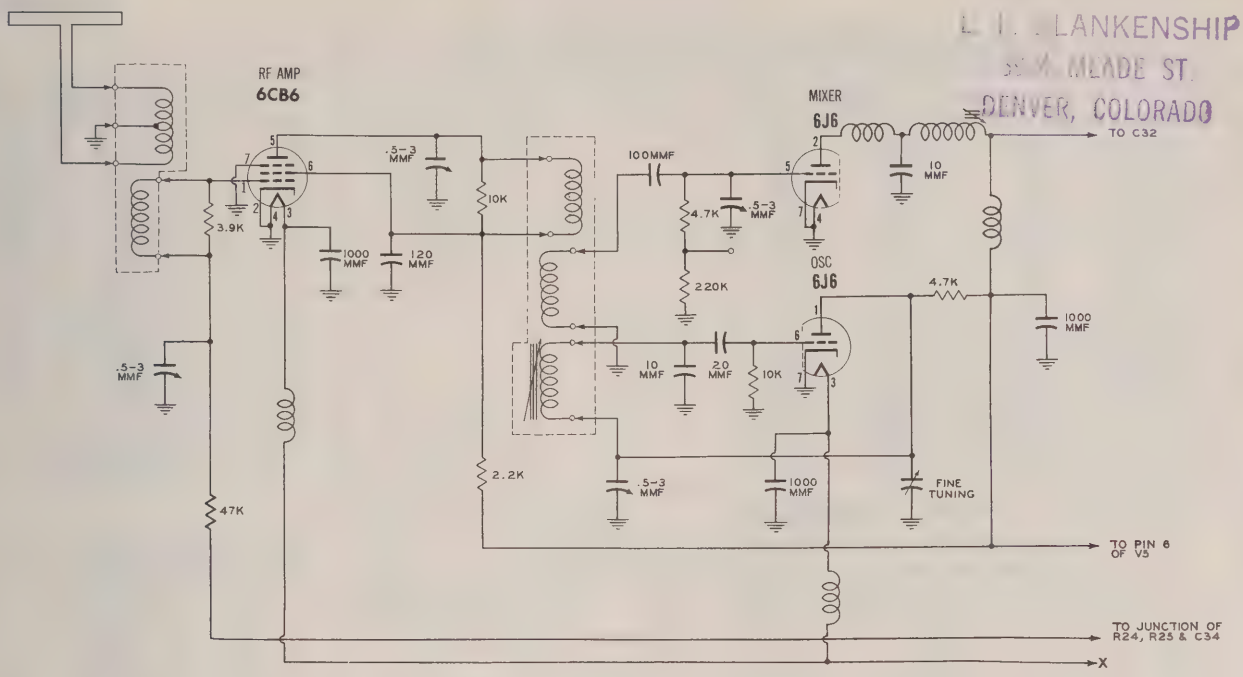
BUZZ

Adjust tuner fine tuning for best picture and sound. Adjust A8 for minimum buzz. If still unsatisfactory, substitute V10 and realign ratio detector and audio IF stages.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

PROPERTY OF
L. L. BLANKENSHIP
[illegible] MEADE ST.
DENVER, COLORADO



ALTERNATE VHF TUNER USED IN SOME MODELS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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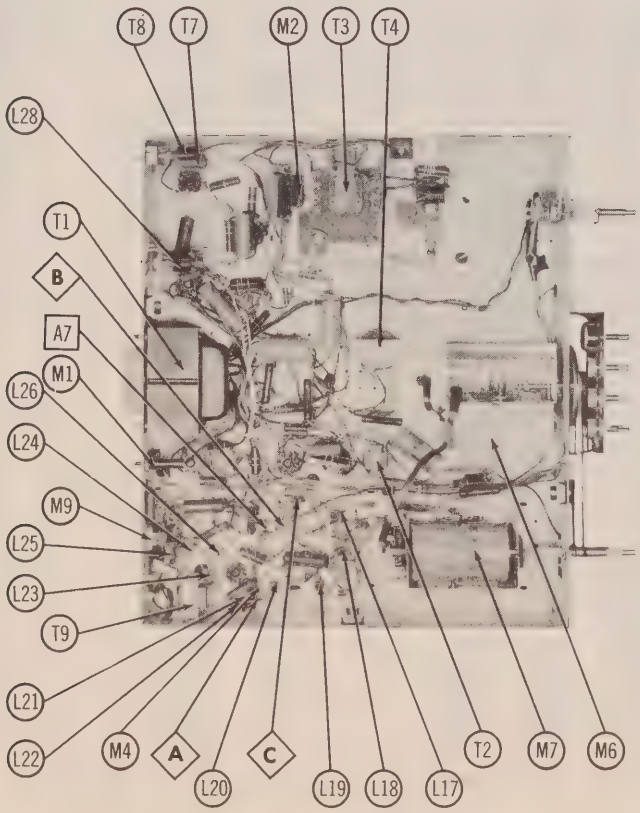
ALTERNATE TUNER SCHEMATIC



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: Philharmonic PART No.	STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	UHF Oscillator	6AF4	6AF4	7DK	
V2	UHF IF Amplifier	6BQ7A	6BQ7A	9AT	
V3	RF Amplifier	6BQ7A	6BQ7A	9AJ	
V4	Converter	6J6	6J6	7BF	
V5	1st. Video IF Amp.	6CB6	6CB6	7CM	
V6	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V7	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V8	Video Output	6AC7	6AC7	9N	
V9	Sound IF Amp.	6AU6	6AU6	7BK	
V10	Ratio Detector - AF Amplifier	6T8	6T8	9K	
V11	Audio Output	6AQ5	6AQ5	7BZ	
V12	Sync Separator - Sync Phase Inv.	12AU7	12AU7	9A	
V13	Vert. Oscillator - Vert. Discharge	6SN7GT	6SN7GT	8BD	
V14	Vert. Output	6S4	6S4	9AC	
V15	Horiz. AFC	6AL5	6AL5	6BT	
V16	Horiz. Mult	6SN7GT	6SN7GT	8BD	
V17	Horiz. Output	6BQ6GT	6BQ6GT	8AM	
V18	Damper	6AX4GT	6AX4GT	4CG	
V19	HV Rectifier	1B3GT	1B3GT	3C	
V20	LV Rectifier	5U4G	5U4G	5T	
V21	Picture tube				Replace with same type used

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: Philharmonic PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲80	500	18-278	FAPH3-459		C1B			R1529	
B	40	450		PR9450/20		BR2045				
C	▲200	50								
C2	40	300	18-299	PR9450/40		BR4035		TC78	TVA-1611	Note 2
C3A	▲40	450	18-277	FAPH3-459		D137		P2375	TVA-3784	
B	200	200		PR9250/30-30				TC88	TVA-1613	
C	80	200								
D	▲40	450								
C4	40	300	18-299	PR9450/40		BR4035		TC78	TVA-1611	
C5	4	50	18-282	PR9150/4		BR550		TC30	TVA-1303	
C6	4	50	18-282	PR9150/4		BR550		TC30	TVA-1303	
C7	9					BR550				
C8	470			BPD-00047	D6-471	K060	821-471	UC-5347	5GA-T47	
C9	470			BPD-00047	D6-471	K060	812-471	UC-5347	5GA-T47	
C10	100			BPD-00101	D6-101	G042	GP1K-101	UC-531	5HK-T1	
C11	470			BPD-00047	D6-471	K060	821-471	UC-5347	5GA-T47	
C12	470			BPD-00047	D6-471	K060	821-471	UC-5347	5GA-T47	
C13	650									
C14	650									
C15	3-8				829-10					
C16	800			EF-001	MFT-1000				503C-D1	
C17	8			SINP0	TCZ-3.3	Z007	NP0K-3R3	ZT-5533	5TCCB-V33	
C18	800			EF-001	MFT-1000				503C-D1	
C19	1.5			SIL.5NP0	TCZ-1.5	Z004	NP0K-1R5	ZT-5515	5TCCB-V15	
C20	.5-3				829-3		3115-01-0R5	CT565A		
C21	47			BPD-000047	D6-470	G033	801-470	UC-5447	5GA-Q47	
C22	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C23	800			EF-001	MFT-1000				503C-D1	
C24	47			BPD-000047	D6-470	G033	801-470	UC-5447	5GA-Q47	
C25	.5-3				829-3		3115-01-0R5	CT565A		
C26	10			SIINP0	TCZ-10	Z018	NP0K-100	ZT-541	5TCC-Q1	
C27	5									
C28	6.8			SI6.8NP0	TCZ-6.8	Z013	NP0K-6R8	ZT-5568	5TCCB-V68	
C29	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C30	800			EF-001	MFT-1000				503C-D1	
C31	800			EF-001	MFT-1000				503C-D1	
C32	120			BPD-00012	D6-121	G044	GP2K-121	UC-5312	5GA-T12	
C33	.022	600	18-197	PDH-022	DF-203	CUB6822	817-02	PT622	6TM-S22	Note 1
C34	5000		18-177	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C35	5000		18-177	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C36	5000		18-177	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C37	5000		18-177	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C38	.2	400	18-188	P488-22		CUB4P22		PT4022	4TM-P22	
C39	5000		18-177	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C40	5000		18-177	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C41	5000		18-177	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C42	5000		18-177	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C43	5000		18-177	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C44	10	500	18-233	1468-00001	D6-100	5W5Q1	GP1K-100	MC215	1FM-41	
C45	.05	400	18-189	P488-05	DF-503	CUB485		PT415	4TM-S5	
C46	220	500	18-230	1468-00025	D6-221	5W5T22	GP2K-221	MC240	1FM-325	
C47	47			SI47	D6-470	TP29	GP1K-470	UC-5447	5GA-Q47	
C48	.22	400	18-188	P488-22		CUB4P22		PT4022	4TM-P22	
C49	3			SIL.2NP0	TCZ-3.2	TZ05	NP0K-3R2		5TCCB-V22	
C50	47			SI47	D6-470	TP29	GP1K-470	UC-5447	5GA-Q47	
C51	120			SII20	D6-121	TP35	GP2K-121	UC-5312	5GA-T12	
C52	5000		18-177	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C53	5000		18-177	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C54	220	500	18-230	1468-00025	D6-251	5W5T22	GP2K-221	MC240	1FM-325	
C55	2000			SI2000	D6-202	TP56	GP2-333-202	UC-523	5HK-D2	
C56	5000		18-177	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C57	5000		18-177	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C58	470	500	18-230	1468-00025	D6-501	5W5T47	GP2K-471	MC245	1FM-35	
C59	.02	600	18-191	P488-02	DF-203	CUB682	817-02	PT612	6TM-S2	
C60	.22	400	18-188	P488-22		CUB4P22		PT4022	4TM-P22	
C61	.002	600	18-198	P866-002	D6-202	CUB6D2	GP2-333-202	PT622	6TM-D2	
C62	.05	400	18-189	P488-05	DF-503	CUB485		PT415	4TM-S5	
C63	.05	400	18-189	P488-05	DF-503	CUB485		PT415	4TM-S5	
C64	.01	600	18-201	P488-01	D6-103	CUB681	GP2-333-103	PT611	6TM-S1	
C65A	.002							PT622		
B	.005		▲33-100	▲PA-110	▲PC-100	▲15TM1	▲1405-01	PT625	▲101C1	
C	.005							PT625		

CAPACITORS (cont)

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: Philharmonic PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C66	.005	600	18-190	P488-005	D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5	
C67	.2	600	18-212	684-2		CUB6P25		PT602	6TM-P2	
C68	.05	600	18-193	P688-05	DF-503	CUB685		PT615	6TM-S5	
C69	.1	600	18-208	P688-1	DF-104	CUB6P1		PT601	6TM-P1	
C70	.0047	600	18-211	P688-0047	D6-472	CUB6D47	GP2L-333-472	PT6247	6TM-D47	
C71	1000		18-220	SI1000	D6-102	TP53	GP2L-102	UC-521	5HK-D1	
C72	1000		18-220	SI1000	D6-102	TP52	GP2L-102	UC-521	5HK-D1	
C73	.01	600	18-201	P688-01	D6-103	CUB681	GP2-333-103	PT611	6TM-P1	
C74	.0047	600	18-211	P688-0047	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C75	.047	600	18-193	P688-047	DF-503	CUB685		PT615	6TM-S5	
C76	3900	500	15-229	1464-004				MCB463	MB-34	
C77	330	500	15-266	1469-00035		5RS733				
C78	.2	600	18-212	684-2		CUB6P25		PT602	6TM-P2	
C79	390	500	15-231	1469-0004		5R5T39		MCB243	MB-34	
C80	390	500	15-231	1469-0004		5R5T39		MCB343	MB-34	
C81	.1	600	18-208	P688-1	DF-104	CUB6P1		PT601	6TM-P1	
C82	.05	1000	18-216	P1088-05		CUB1685		PT1615	MB-35	
C83	.033	1000	18-194	P1088-033		PM10S33				Note 3
C84	.2	600	18-212	684-2		CUB6P25		PT602	6TM-P2	
C85	50	2000							30GA-Q5	

Note 1. Used only with cascode type tuner.
Note 2. Used only in models with UHF tuner.
Note 3. Some models use .03MFD in this application.
* Items C65A, C65B, C65C, R62A, R62B, R62C are combined in one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: Philharmonic PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1000Ω	½	P24-190A	* QJ-326			UF13R	Contrast (Panel)
B	500KΩ	½					UR58A	Volume (Rear)
C	Switch						US-26	Attach to R1B
R2	225Ω	4	P25-19		RTV-319		TVF143	Focus wire wound Note 2
R3A	50KΩ	½	25-18	QU-123	A47-50K-S	AB-31	U-35	Brightness Note 1
B	Shaft		Not Req.	Not Req.	KS8-3	AK-4	Not Req.	Attach to R3A
R4A	50KΩ	½	25-18	QU-123	A47-50K-S	AB-31	U-35	Horiz. Hold Note 1
B	Shaft		Not Req.	Not Req.	KS8-3	AK-4	Not Req.	Attach to R4A
R5A	2 Meg	½	25-20	QU-139	A47-2 Meg-S	AB-75	U-56	Vert. Hold Note 3
B	Shaft		Not Req.	Not Req.	KS8-3	AK-4	Not Req.	Attach to R5A
R6A	2 Meg	½	25-15	QU-139	A47-2 Meg-S	AB-75	SU-56	Height
B	Shaft		Not Req.	Not Req.	FK8-1/4	AK-1	Not Req.	Attach to R6A
R7A	25000Ω	½	25-13	QU-113	A47-3000-S	AB-7	U-8	Vert. Linearity
B	Shaft		Not Req.	Not Req.	FK8-1/4	AK-1	Not Req.	Attach to R7A

* CONCENTRIKIT EQUIVALENT KIT K-2 BASE ELEMENTS & SHAFTS B17-105 & R1-324 (Panel)
B13-133 & R2-306 (Rear) & SWITCH 76-1.
Note 1. Some models may use an alternate control on rear of chassis Part No. 25-10.
Note 2. Some models may use an alternate control on rear of chassis Part No. 25-14.
Note 3. Some models may use an alternate control on rear of chassis Part No. 25-15.

RESISTORS

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: Philharmonic PART No.	IRC PART No.	NOTES
R8	5600Ω	1		BTA-5600	
R9	8200Ω	2		BTB-8200	
R10	270Ω	½		BTS-27	
R11	1 Meg	½		BTS-1 Meg	
R12	100Ω	½		BTS-100	
R13	1000Ω	½		BTS-1000	
R14	15KΩ	½		BTS-15K	
R15	47KΩ	½		BTS-47K	
R16	100KΩ	½		BTS-100K	
R17	180KΩ	½		BTS-180K	
R18	100KΩ	½		BTS-100K	
R19	1500Ω	½		BTS-1500	
R20	10KΩ	½		BTS-10K	
R21	220KΩ	½		BTS-220K	
R22	10KΩ	½		BTS-10K	
R23	15KΩ	½		BTS-15K	
R24	4700Ω	½	80-759	BTS-4700	
R25	680Ω	½	80-653	BTS-680	
R26	560Ω	½	80-806	BTS-56	
R27	6800Ω	½	80-786	BTS-6800	
R28	100Ω	½	80-654	BTS-100	
R29	1 Meg	½	80-668	BTS-1 Meg	
R30	56Ω	½	80-806	BTS-56	
R31	100Ω	½	80-654	BTS-100	
R32	6800Ω	½	80-786	BTS-6800	
R33	82Ω	½	80-776	BTS-82	
R34	5600Ω	½	80-874	BTS-5600	
R35	470KΩ	½	80-681	BTS-470K	
R36	220Ω	½	80-776	BTS-82	
R37	1000Ω	½	80-873	BTS-1000	
R38	6800Ω	2	80-908	BTB-6800	
R39	10KΩ	½	80-760	BTS-10K	
R40	3300Ω	2	80-816	BTB-3300	
R41	100KΩ	½	80-801	BTS-100K	
R42	100KΩ	2	80-801	BTB-100K	
R43	22KΩ	2	80-810	BTB-22K	
R44	7500Ω	10	80-877	1 3/4A-7500	Note 1
R45	5100Ω	2	80-877	BTB-5100	Note 1
R46	150Ω	½	80-767	BTS-150	
R47	47KΩ	½	80-730	BTS-47K	
R48	27KΩ	½	80-784	BTS-27K	
R49	4.7 Meg	½	80-779	BTS-4.7Meg	
R50	270KΩ	½	80-747	BTS-270K	
R51	100KΩ	½	80-801	BTS-100K	
R52	180KΩ 5%	½	80-788	BTS-180K 5%	

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: Philharmonic PART No.	IRC PART No.	NOTES
R53	330KΩ 5%	½	80-787	BTS-330K 5%	
R54	800Ω	10	80-800	1 3/4A-800	
R55	1.5 Meg	½	80-782	BTS-1.5 Meg	
R56	22KΩ	½	80-744	BTS-22K	
R57	680KΩ	½	80-807	BTS-680K	
R58	22KΩ	½	80-744	BTS-22K	
R59	2200Ω	½	80-714	BTS-2200	
R60	15KΩ	½	80-785	BTA-15K	
R61	2200Ω	½	80-714	BTS-2200	
R62A	22KΩ	½		BTS-22K	
B	8200Ω	½	▲ 33-100	BTS-8200	
C	8200Ω	½		BTS-8200	
R63	1.5 Meg	½	80-890	BTS-1.5 Meg	
R64	10KΩ	½	80-760	BTS-10K	
R65	22KΩ	½	80-744	BTS-22K	
R66	3.3 Meg	½	80-890	BTS-3.3Meg	
R67	56KΩ	½	80-802	BTS-56K	
R68	470KΩ	½	80-681	BTS-470K	
R69	82000Ω	½	80-778	BTS-8200	
R70	2.2Meg	½	80-726	BTS-2.2Meg	
R71	680Ω	½	80-683	BTS-680	
R72	560Ω	½		BTS-560	
R73	560Ω	½		BTS-560	
R74	100KΩ	½	80-801	BTS-100K	
R75	100KΩ	½	80-801	BTS-100K	
R76	470KΩ	½	80-681	BTS-470K	
R77	4.7Meg	½	80-779	BTS-4.7Meg	
R78	15KΩ	½	80-785	BTA-15K	
R79	1500Ω	½	80-729	BTS-1500	
R80	5600Ω	½	80-874	BTS-5600	
R81	100KΩ	½	80-801	BTS-100K	
R82	270KΩ	½	80-747	BTS-270K	
R83	120KΩ	½		BTS-120K	
R84	4700Ω	½	80-675	BTS-4700	
R85	470KΩ	½	80-681	BTS-470K	
R86	56Ω	½	80-806	BTS-56	
R87	27Ω	2	80-878		
R88	1200Ω	2	80-879		
R89	120Ω	2	80-879		
R90	25KΩ	10	80-804	1 3/4A-25K	
R91	7500Ω	10	80-876	1 3/4A-7500	
R92	3.3Ω	½	80-691		
R93	470KΩ	2	80-682	BTB-470K	
R94	330Ω	2	80-682	BTB-330	
R95	7500Ω	10	80-876	1 3/4A-7500	Note 2

Note 1. Used only in sets with cascode type tuner.
Note 2. Used only in sets with UHF tuner.
* Items R62A, R62B, R62C, C65A, C65B, C65C are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	SEC. 1	SEC. 2	REPLACEMENT DATA: Philharmonic PART No.	Stancor PART No.	Merit PART No	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC ▲ 1.74A	760VCT ▲ .180A	5VAC ▲ 3A	80-266-1	P-8169 ①	P-3087 ②	R-33BC		P9731 ①	26R19 ③④
	SEC. 3	SEC. 4	SEC. 5							
	6.3VAC ▲ 1.45A	6.3VAC ▲ 8.7A								

① Parallel and phase 6.3V ▲ 5A and 7A windings for Sec. # 4.
② Tape low tape on high voltage secondary.
③ Tape one 5V winding.
④ Tape 5V ▲ 2A winding.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	SEC. 1	SEC. 2	REPLACEMENT DATA: Philharmonic PART No.	Stancor PART No.	Merit PART No	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC ▲ 1.74A	760VCT ▲ .180A	5VAC ▲ 3A	80-266-1	P-8169 ①	P-3087 ②	R-33BC		P9731 ①	26R19 ③④
	SEC. 3	SEC. 4	SEC. 5							
	6.3VAC ▲ 1.45A	6.3VAC ▲ 8.7A								

① Parallel and phase 6.3V ▲ 5A and 7A windings for Sec. # 4.
② Tape low tape on high voltage secondary.
③ Tape one 5V winding.
④ Tape 5V ▲ 2A winding.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: Philharmonic PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T2	Vert. Osc. Trans.	80-257	A-8125	A-3003	A-97X	209T1①	B8702	24A87①
T3	Horiz. Output Trans.	80-265-2	A-8136 *	HV0-10 * ②	D-15 * ②	231T1 * & 214R1 ②	FB410 * ②	
T4	Vert. Output Trans.	80-261	A-8123	A-3037	A-102X	222T1	Z1804	26S52
T5A	Yoke-Horiz. (11MH)	10-601	DY-2A	MDF-70	Y-21-1	206D1⑤	DF602	Y-6
B	Yoke-Vert. (40.5MH)							
T6	Focus Coil	10-576	FC-11	MF-2	B-470		EM701	FC-3
T7	Horiz. Linearity (4.5-28MH)	10-561	WC-5①⑤	MWC-1①⑤	WC-11①⑤	215R1	RF800④ ⑤	WC-30④ ⑤
T8	Width (4.5-28MH)	10-561	WC-5①⑤	MWC-1①⑤	WC-11①⑤	215R1	RF800④ ⑤	WC-20④ ⑤

① Drill one new mounting hole.
② Drill new mounting holes.
③ Use original yoke network.
④ Enlarge mounting hole.
⑤ Connect to coded red and blue terminals.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Stancor Replacement Connections	Merit Replacement Connections	Triad Replacement Connections	RCA Replacement Connections	Halldorson Replacement Connections	Thordarson Replacement Connections
3	3	3	1B3 Rect Plate Lead	1B3 Rect Plate Lead	1B3 Rect Plate Lead	
2	2	2	7	3	9	
1	1	1	8	1	4	
4	4	4	4	10	8	
5	5	5	1	8	6	
6	NC	NC	NC	NC	NC	
7	7	6	"T"	4	7	
9	9	7	6	(Term. 'C') 214R1	1	
8	8	9	2	(Term. 'D') 214R1	11	
Connect Width Coil Across	8 & 9	7 & 9	6 & 2	214R1 (Term "A" & "B")	1 & 11	
Special Notes →		⑥	⑥	⑦	⑥	

⑥ If the picture is out of phase, reverse AFC winding.
⑦ Remove original width coil and connect primary of 214R1 across terminals 4 &5. Connect secondary to AFC. If picture is out of phase, reverse primary or secondary of 214R1.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI	SEC	REPLACEMENT DATA: Philharmonic PART No.	Stancor PART No	Merit PART No	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T9	5. 2KΩ	3 to 4Ω	80-253	A-3877 ①	A-3019	S-5Z	Z1002	26S49	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: Philharmonic PART No.	VIKING PART No.	QUAM PART No.	NOTES
SP1A	5"	PM	3 to 4Ω	79-388	5J4	5A1	
B	8"	PM	3 to 4Ω	79-390	8J9	8A21	
C	10"	PM	3 to 4Ω	79-389	10J7	10A31	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: Philharmonic PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Fil. Choke	0Ω						
L2	Fil. Choke	0Ω						
L3	IF Input Coil Primary	0Ω						
L4	IF Input Coil Secondary	0Ω						
L5	IF Input Coil Mutual	0Ω						
L6	RF Choke	.2Ω						
L7	Neutr. Coil	.2Ω						
L8	UHF IF Output Trans.	0Ω	0Ω					

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA Philharmonic PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L9	VHF Ant. Coils	0ΩCT	0Ω					Includes capacitors
L10	Fil. Choke	0Ω						
L11	Neutr. Coil	0Ω						
L12	VHF RF, Mixer grid & Osc. Coils	0Ω						
L13	Fil. Choke	0Ω						
L14	RF Choke	0Ω						
L15	1st Video IF	1Ω						
L16	RF Choke	1.3Ω						
L17	Fil. Choke	0Ω						
L18	2nd Video IF	.3Ω	.3Ω	10-573	17-1062	TV-116	6250	
L19	3rd Video IF	.3Ω	.3Ω	10-573	17-1063	TV-116	6249	
L20	4th Video IF	.3Ω	.3Ω	10-573	17-1063	TV-116	6249	
L21	Series Peaking Coil	2.6Ω		10-567	19-3036	TV-180	6176	36 Micorhenries
L22	Shunt Peaking Coil	10Ω		10-558	19-3300		4648	375 Microhenries
L23	Series Peaking Coil	7.5Ω		10-568	19-4200	TV-185 †	4646 †	225 Microhenries; wound on 10KΩ resistor
L24	4.5MC Trap	2.1Ω		10-562	20-1004	TV-151	1470	
L25	Shunt Peaking Coil	12Ω		10-569	19-3500	TV-188	6174	510 Microhenries
L26	Sound IF	2.1Ω		10-556	17-3400	TV-151	1469	
L27	Ratio Det.	6Ω	2.3Ω	10-553 *	17-3497	TV-115	6205	Tertiary winding=2.9Ω
L28	Horiz. Osc.	50Ω		10-555	19-1576	TV-163	6210	

† Parallel with 10KΩ resistor.
* Alternate Part # 10-552.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA Philharmonic PART No. FUSE	Philharmonic PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG	5A	43-12		312005. (3AG -5A)	341001	MTH5	HKP
M2	3AG P/T	1/4A 250V	43-13		318.250 (3AG-P/T 1/4A)		GJV 1/4	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA Philharmonic PART No.	SYLVANIA PART No.	FEDERAL PART No.	NOTES
M3	1N82		1N82 or A		UHF mixer
M4	1N64	48-46	1N132	1N64A	Video detector

MISCELLANEOUS

ITEM No.	PART NAME	Philharmonic PART No.	NOTES
M5	Dial Light		#47
M6	Tuner	CV-101	UHF Converter
M7A	Tuner	TU-1003	VHF (Cascode - 13th. position for UHF)
B	Tuner	TU-1000	VHF (Standard)
M8	Switch		UHF-VHF Changeover
M9	Switch	46-101	TV-Phono
M10	Ion Trap	83-670	
M11	Correction Magnet		
B2	Trimmer Cap.	20-145	Horiz. Drive
	Knob	52-107	Channel Selector
	Knob	52-108	Fine tuning
	Knob	52-109	Volume
	Knob	52-110	Contrast
	Knob	52-111	Trap door
	Safety Glass	40-205	Model 920
	Safety Glass	40-209	Model 9120
	Safety Glass	40-204	Model 9820
	Safety Glass	40-206	Model 924
	Safety Glass	40-208	Models 9121 & 9821

TROUBLE SHOOTING AIDS (cont)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

POWER

DEAD SET

If filaments fail to light, check fuse M1, AC interlock assembly, switch on volume control and T1. If filaments light, substitute V20. Check B+ filter and decoupling network components for failure or change of value.

SMALL AND/OR DIM PICTURE

Substitute V20. Check B+ filter and decoupling network components.

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check fuse M2. Check by substitution V16, V17, V18 and V19. Check waveform W13.

If Satisfactory	If Unsatisfactory
Check T3, T5A, R92, R93, R90, C81, C84 and other associated components.	Check C80, C77, R82, R83, R86, and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V16, V17, V18, V19 and V20. Check picture tube. Proceed as outlined under "Loss of High Voltage".

BLOOMING

Check by substitution V16, V17, V18, V19 and V20. Check R92, R93, R90, C81, C84, T3, T5A, picture tube and other associated components.

GENERAL

RASTER SOUND NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER PICTURE NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER NO SOUND NO PICTURE

Check by substitution V3, V4, V5, V6, V7 and V8. Check tuner, video IF and video detector components. In case of UHF check V1 and V2. Check UHF tuner components.

NO RASTER NO SOUND

Follow procedure outlined under "Dead Set".

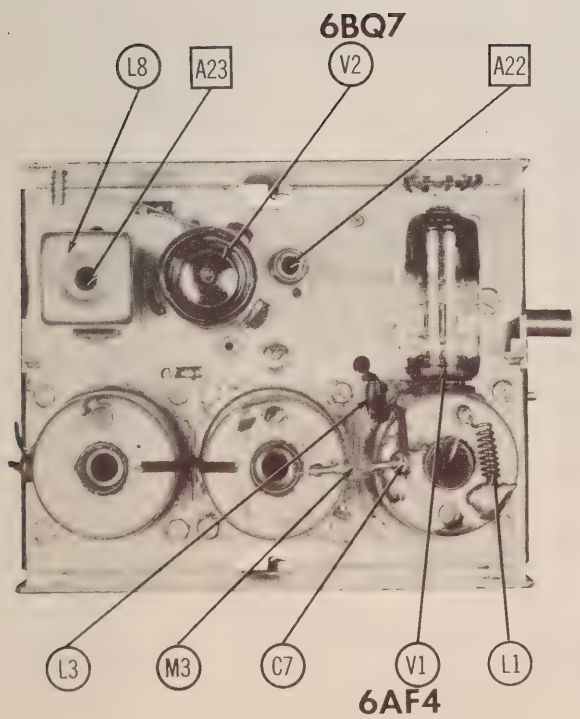
KEYSTONE EFFECT

Check T5, R72, R73, and C85.

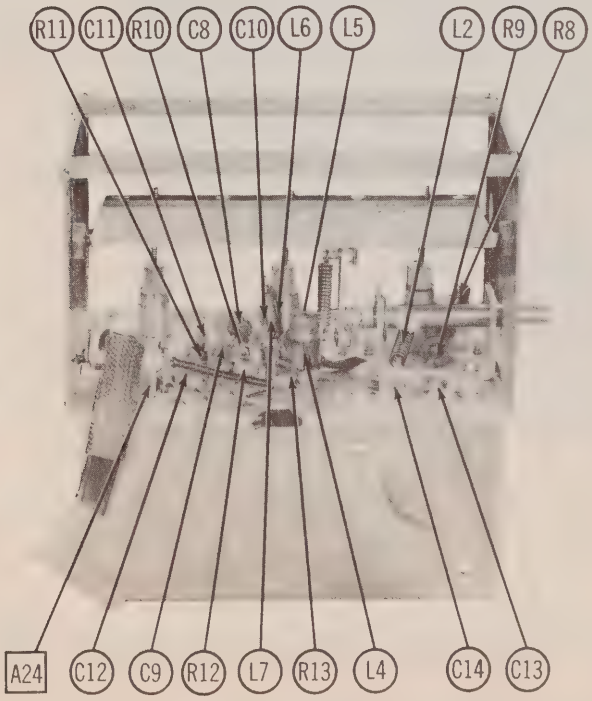
INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



UHF TUNER TOP VIEW



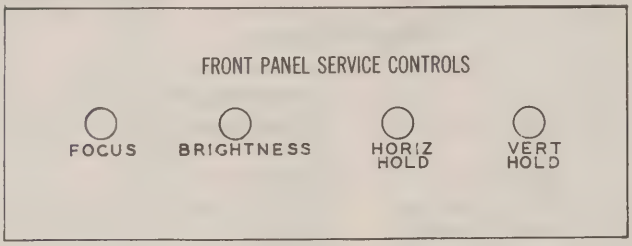
UHF TUNER BOTTOM VIEW

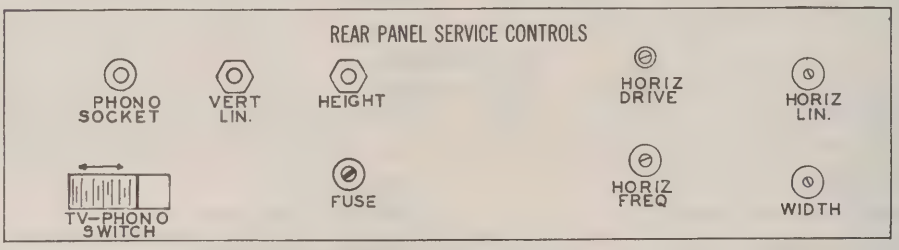
SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator Circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, thru the small hole in the cabinet to the right of the channel selector shaft.

SERVICE ADJUSTMENT LOCATION





HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the rear panel of the chassis. Set the horizontal hold control at the mid-position of its range and adjust the horizontal frequency slug (L28) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

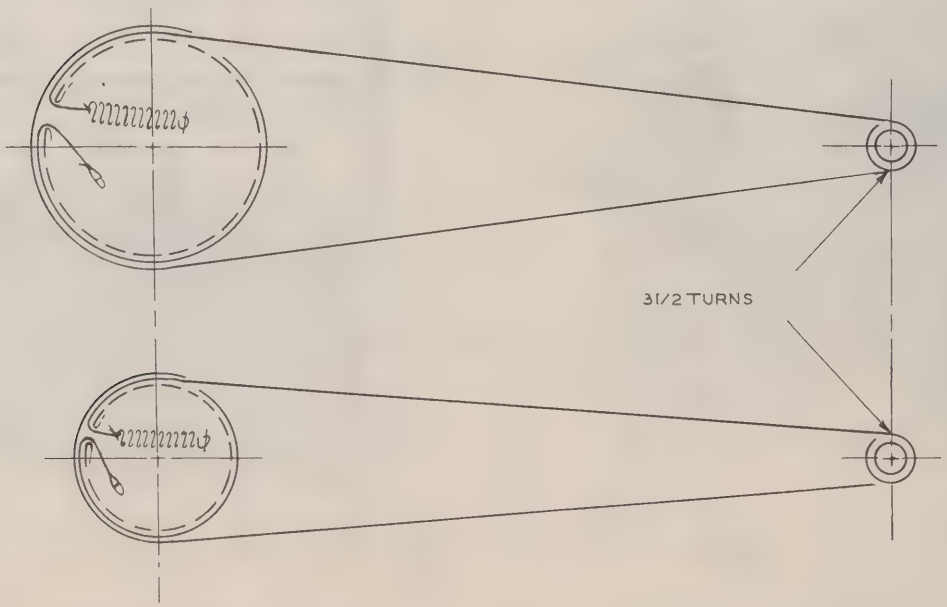
To eliminate sound IF detector buzz, adjust the ratio detector secondary (L27) located on top of chassis. (See tube placement chart).

FUSES

Two fuses are used. One for horizontal sweep circuit protection and one for LV power supply protection (For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by positioning the focus coil. Adjust the three speed nuts located on the focus coil bracket until picture is properly centered.



UHF DRIVE CORD STRINGING

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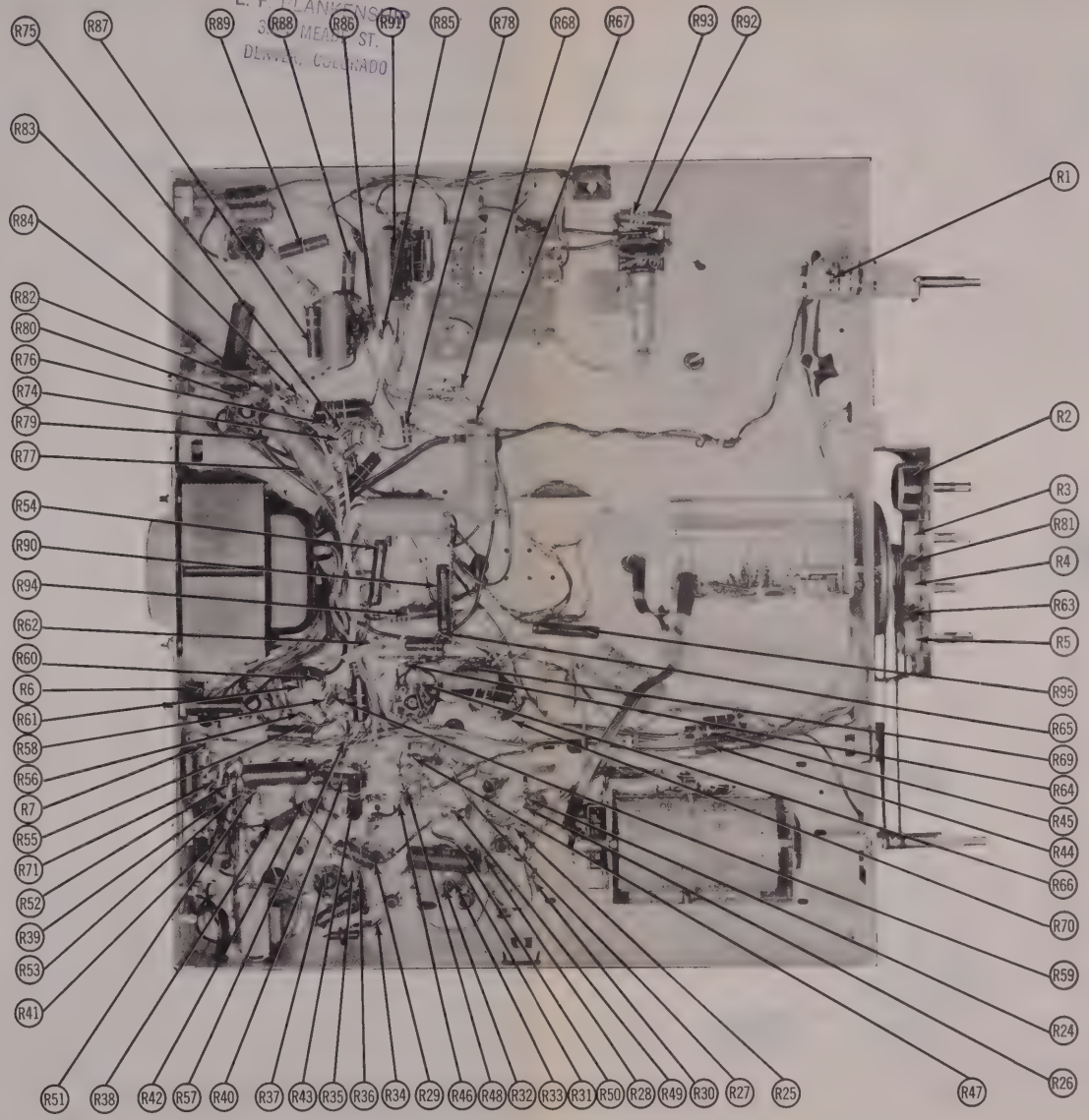
L. F. DLANKENSHIP
3[illegible] MEADE ST.
DENVER, COLORADO



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PHOTOFACT* Folder

RETMA MEMBER

RCA VICTOR MODELS
24-T-420, U, 24-T-435, U (Ch. KCS84C, E)

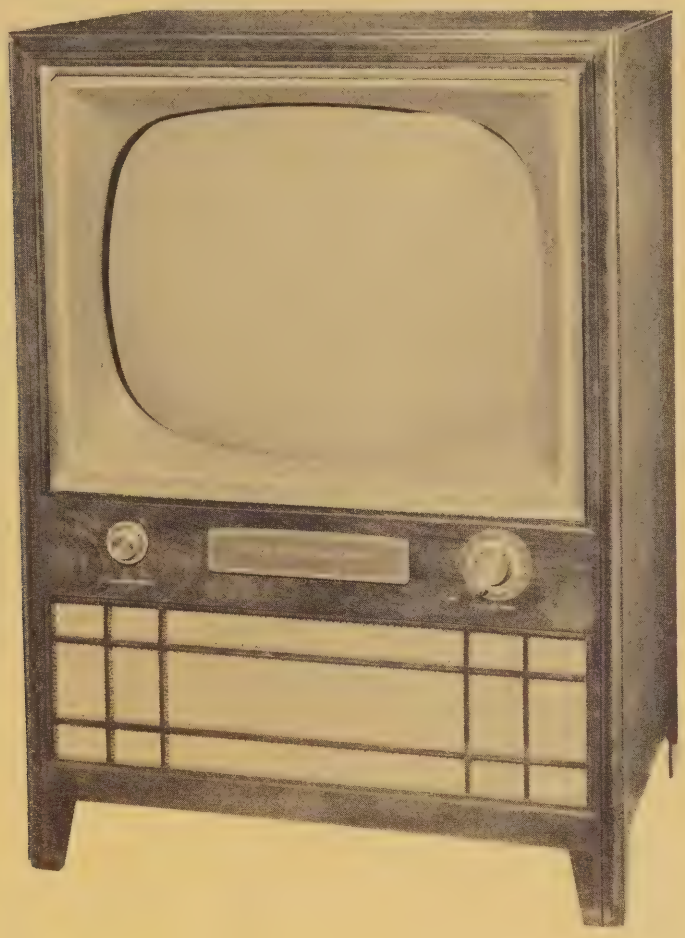
IMPORTANT FILING NOTICE

The contents for this envelope will be found among the last folders in this complete set of folders . . . *unless* it has been purchased as part of a *complete* volume of PHOTOFACTS assembled in a DeLuxe Binder.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST
DENVER, COLORADO

RCA VICTOR MODELS
24-T-420, U, 24-T-435, U (Ch. KCS84C, E)



MODEL 24-T-420

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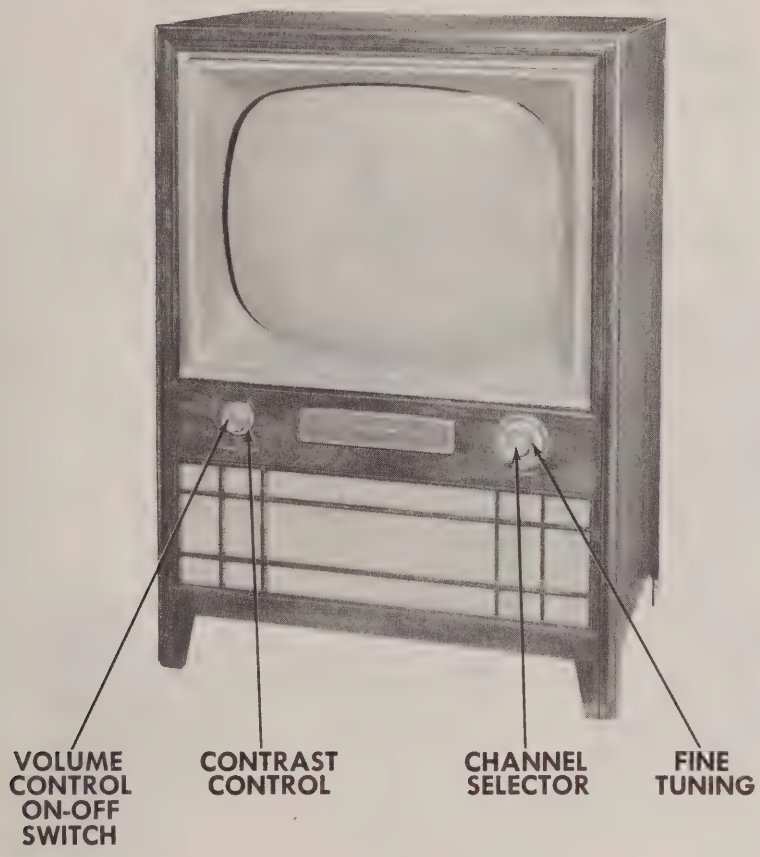
RCA VICTOR MODELS 24-T-420, U, 24-T-435, U (Ch. KCS84C, E)



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RCA VICTOR MODELS
24-T-420, U, 24-T-435, U (Ch. KCS84C, E)

RCA VICTOR MODEL 24-T-420

TRADE NAME	RCA Victor Models 24-T-420, 24-T-435 (Ch. KCS84C) 24-T-420U, 24-435U (Ch. KCS84E)
MANUFACTURER	RCA Victor Div., Radio Corp. of America, Camden, N. J.
TYPE SET	Television Receiver
TUBES	Twenty-two
POWER SUPPLY	110-120 Volts AC-60 cycle RATING 2 Amp. @ 117Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45. 75MC, Sound IF 41. 25MC (Intercarrier)

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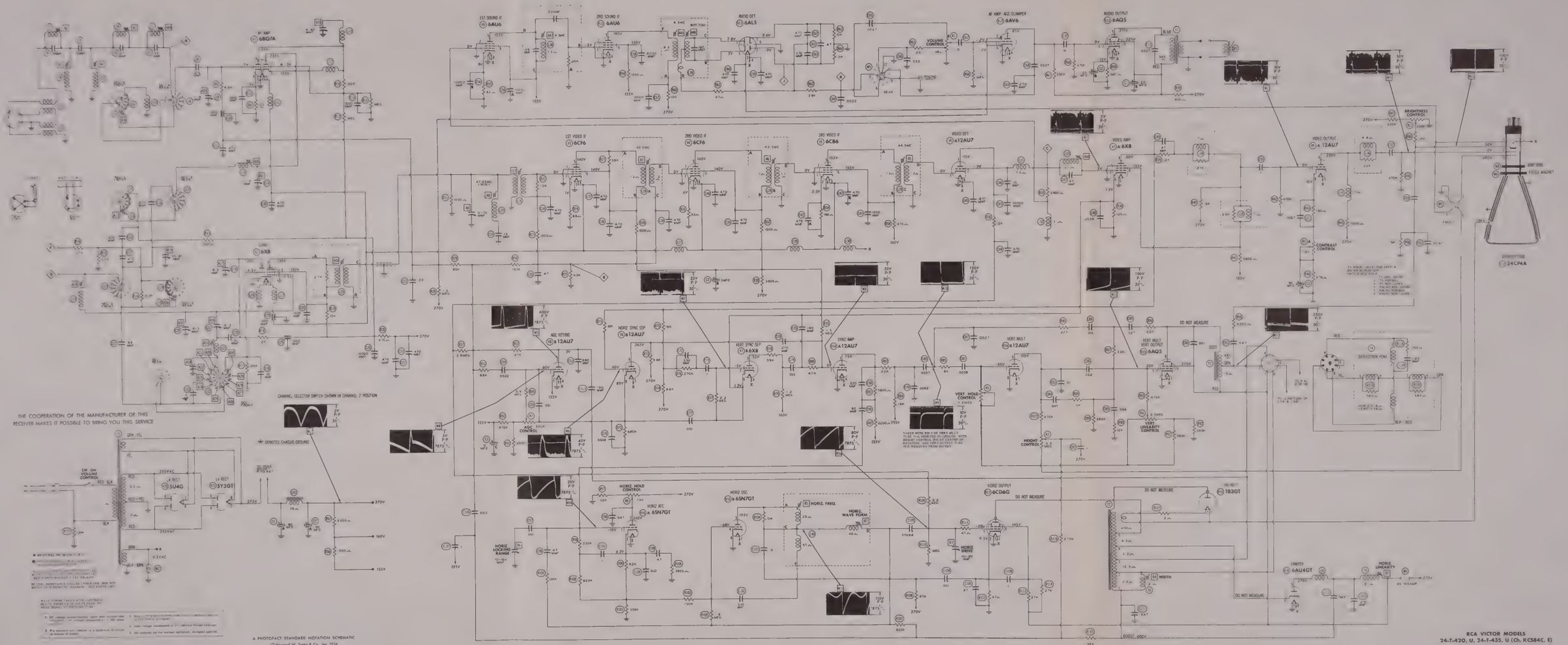
RCA VICTOR MODELS
24-T-420, U, 24-T-435, U (Ch. KCS84C, E)
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 2 POSITION
DENOTES CHASSIS GROUND
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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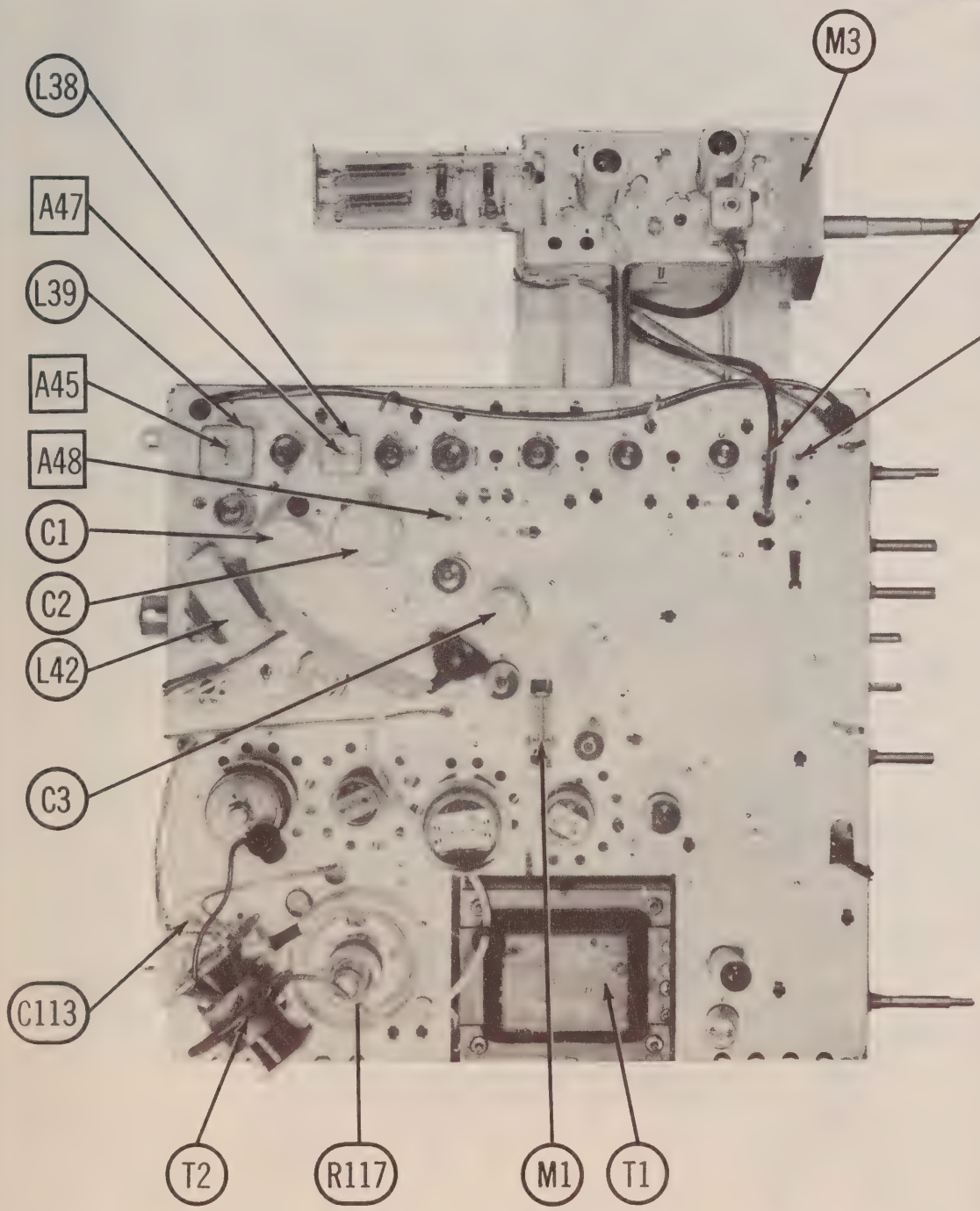
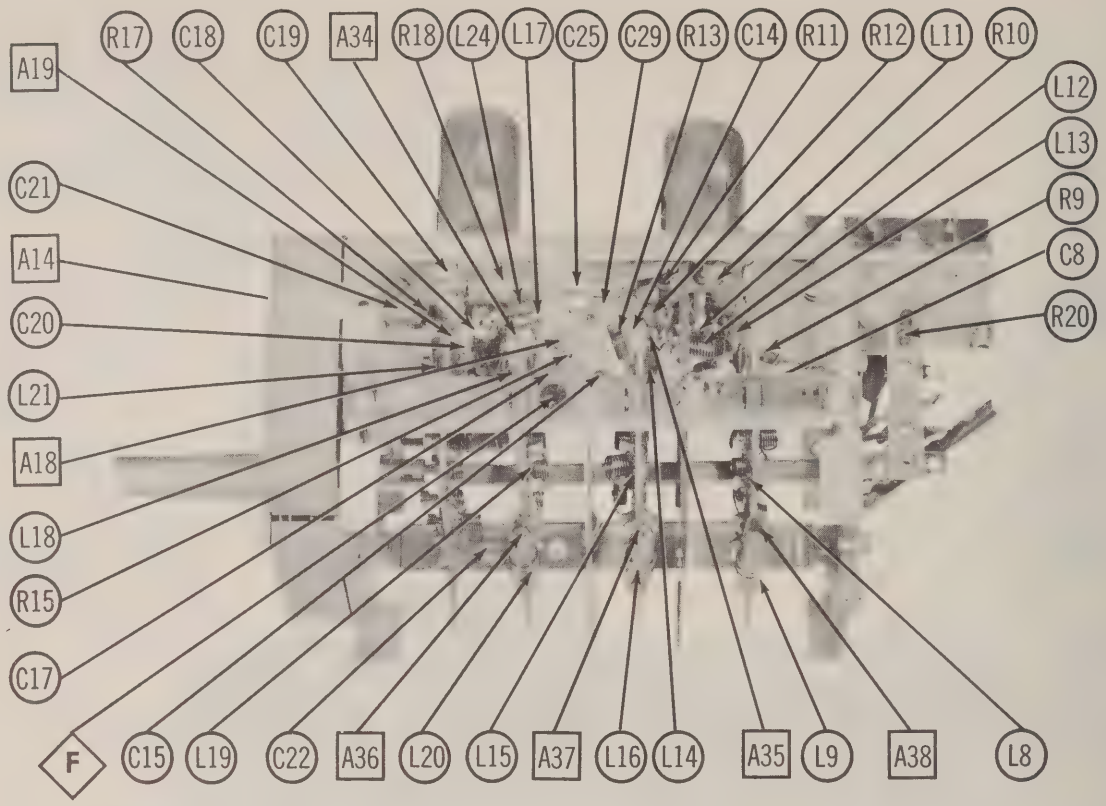
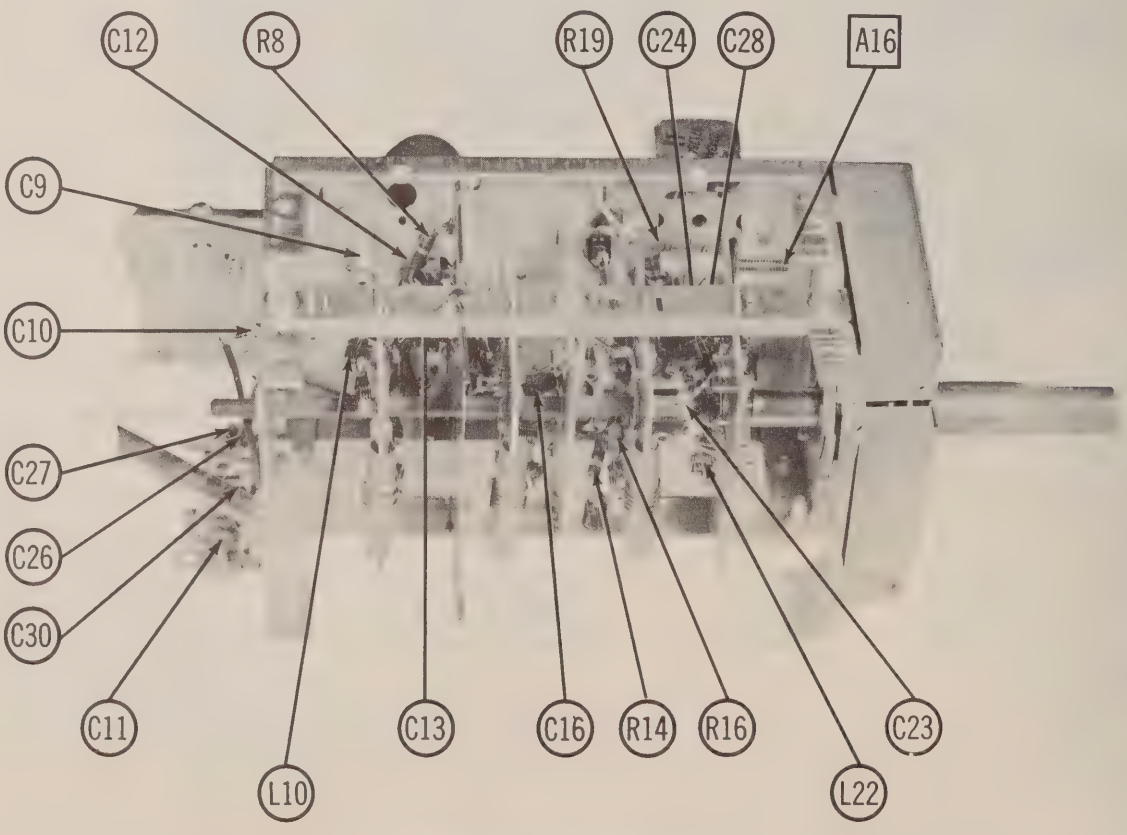


CHASSIS TOP VIEW



VHF TUNER-RIGHT SIDE



VHF TUNER-LEFT SIDE

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ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal oscillator tube (V16) to disable the high voltage.

KRK22C OR KRK29A ANTENNA MATCHING UNIT ALIGNMENT

The antenna matching unit has been properly aligned at the factory. The RF unit is aligned with a particular antenna matching unit in place. If a new antenna unit is installed, the RF unit should be realigned. Alignment should not be attempted without the proper alignment facilities. The FM trap which is located on the antenna matching unit may be adjusted without affecting the RF alignment. Disconnect the lead from the FM trap (L7) to the channel selector switch. Use a short jumper to connect point ⟨A⟩ on the matching unit through a .001MFD capacitor to Pin 1 (grid) of the second video IF amplifier (V4). Remove the first video IF amplifier (V3) from its socket. Cover of matching unit must be in place during alignment. Connect the ends of a 1000Ω potentiometer across a 7.5 volt battery capable of withstanding considerable current drain connect the positive terminal to chassis and the potentiometer arm to point ⟨B⟩. Set the potentiometer arm to obtain -5 volts at this point.

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	Not used	45.75MC (400∿Mod)	Any	Vert. Amp. to point ⟨C⟩. Low side to chassis.	A1	Set scope gain to maximum and adjust A1 for MINIMUM 400∿ indication on scope.
2.	"	"	"	41.25MC (400∿Mod)	"	"	A2	"
3.	"	"	50MC (20MC Swp)	50MC 52MC 53MC 60MC	"	Vert. Amp. thru detector probe (Fig.1) to point ⟨A⟩. Low side to chassis.	A3, A4	Remove the .001MFD capacitor (see instructions above) from point ⟨A⟩ and connect a 300Ω, 1/2 watt carbon resistor from point ⟨A⟩ to chassis using very short leads. Adjust A3 and A4 to obtain response curve similar to Fig. 2. Repeat steps 1, 2 and 3 until no further improvement is noted. Remove the 300Ω resistor and the detector probe. Restore connection between L7 and the channel switch. Replace V3.

VIDEO IF ALIGNMENT FOR RECEIVERS USING VHF TUNER KRK22C

Turn AGC control to its fully clockwise position.

Connect the bias supply as under antenna matching unit alignment and adjust for -5 volts.

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	.0015MFD Ceramic Capacitor	High side to terminal "A" of L26. Low side to chassis.	Not used	44.5MC	Any not used locally	Use VTVM. DC probe to point ⟨C⟩. Common to chassis.	A5	Attenuate generator output to maintain not more than -3 volts on VTVM. Adjust for maximum deflection.
5.	"	"	"	45.5MC	"	"	A6	"
6.	"	"	"	43.0MC	"	"	A7	"
7.	"	"	"	47.25MC	"	"	A8	Adjust for MINIMUM deflection.
8.	"	High side thru .0015MFD to point ⟨D⟩. Low side to chassis. Use very short lead.	44MC (10MC Swp)	42.5MC 45.75MC 47.25MC	4	Vert. Amp. of scope thru detector (Fig.1) to pin 5 (plate) of 6CF6 (V3). Low side to chassis.	A9, A10, A11	Preset A9 to minimum capacity. Clip 330Ω carbon resistors across primaries (plate to screen) of L28B and L28C. Connect a 180Ω carbon resistor from plate to screen of first video IF amp. (V3). If a second signal generator is used for markers, couple its output loosely to detector (Fig.1). Adjust A10 and A11 for maximum gain with 45.75MC at 75% response as in Fig. 3. Attenuate generator output to maintain 0.3 volt peak to peak response on scope. Adjust A9 to place 42.5 MC marker at 70% on response curve.
9.	"	"	"	42.5MC 45.0MC 45.75MC 46.5MC	"	Vert. Amp. to point ⟨C⟩. Low side to chassis.		Disconnect the 180Ω and the two 330Ω resistors. Attenuate generator output to maintain 3 volts peak to peak on scope. Retouch A5, A6 and A7 for response similar to Fig. 4. Continue alignment with step 14.

VIDEO IF ALIGNMENT FOR RECEIVERS USING VHF-UHF TUNER KRK29A/27

Turn AGC control to its fully clockwise position. Connect the bias supply as under antenna matching unit alignment and adjust for -5 volts.

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	.0015MFD Ceramic Capacitor	High side to terminal "A" of first video IF transformer. Low side to chassis.	Not used	44.5MC	Any not used locally	Use VTVM. DC probe to point ⟨C⟩. Common to chassis.	A5	Attenuate generator output to maintain not more than -3 volts on VTVM. Adjust for maximum deflection.
5.	"	"	"	45.5MC	"	"	A6	"
6.	"	"	"	43.0MC	"	"	A7	"
7.	"	"	"	47.25MC	"	"	A8	Adjust for MINIMUM deflection.
8.	"	High side thru .0015 MFD to point ⟨D⟩. Low side to chassis. Use very short leads.	44MC (10MC Swp)	42.5MC 45.75MC 47.25MC	4	Vert. Amp. of scope thru detector (Fig.1) to pin 5 (plate) of first video IF amp. Low side to chassis.	A9, A10, A11	Preset A9 to MINIMUM capacity. Clip 330Ω carbon resistors from plate to screen of second and third video IF amplifiers (6CF6 and 6CB6). Connect a 180Ω carbon resistor from plate to screen of first video IF amp. (6CF6). If a second signal generator is used for markers, couple its output loosely to detector (Fig.1). Adjust A10 and A11 for maximum gain with 45.75MC at 75% response as in Fig. 3. Attenuate generator output to maintain 0.3 volt peak to peak response on scope. Adjust A9 to place 42.5MC at 70% on response curve.

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ALIGNMENT INSTRUCTIONS (cont)

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	.0015MFD Ceramic Capacitor	High side to terminal "A" of first video IF transformer. Low side to chassis.	44MC (10MC Swp)	42.5MC 45.0MC 45.75MC 46.5MC	Any not used locally	Vert. Amp. to point (C). Low side to chassis.		Disconnect the 180Ω and the two 330Ω resistors. Attenuate generator output to maintain 3 volts peak to peak on scope. Retouch A5, A6 and A7 for response similar to Fig. 4.
10.	1000Ω Carbon Resistor in series with .0015 MFD ceramic capacitor	High side to rear terminal of 1N82 crystal holder. Low side to tuner case. Use very short leads.	671MC (10MC Swp)	669.25MC 673.75MC	47	Vert. Amp. thru detector (Fig.1) to junction of 180Ω and .0015MFD (see remarks). Low side to chassis.	A12 A13	Connect 180Ω carbon resistor in series with .0015MFD ceramic capacitor between point (K) and chassis with capacitor end connected to point (R). If VHF marker generator is used couple it loosely to detector (Fig.1). Connect the potentiometer arm of a second bias supply to tuner AGC terminal. Connect positive side to chassis. Adjust for -3 volts. Attenuate sweep generator for 0.3 volts peak to peak on scope. Adjust A12 and A13 for maximum gain and response similar to Fig. 5. Remove 180Ω resistor and .0015MFD capacitor from point (K) and chassis.
11.	1000Ω Carbon Resistor in series with .0015 MFD ceramic capacitor	High side to rear terminal of 1N82 crystal holder. Low side to tuner case. Use very short lead.	671MC (10MC Swp)	669.25MC 673.75MC	47	Vert. Amp. to point (C). Low side to chassis.		Adjust sweep generator output for 3 volts peak to peak on scope. If necessary, retouch ONLY A12 and A13 to obtain response similar to Fig. 5. The markers should not fall below 90% as shown.
12.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	213MC (10MC Swp)	42.5MC 45.0MC 45.75MC 46.5MC	13	"		Couple marker generator loosely to first video IF amplifier grid. Check for response curve similar to Fig. 4 on all VHF channels. SLIGHTLY retouch A5 and A6 to correct for any overall tilt that is approximately the same on all VHF channels.
			207MC (10MC Swp)	"	12			
			201MC (10MC Swp)		11			
			195MC (10MC Swp)		10			
			189MC (10MC Swp)		9			
			183MC (10MC Swp)		8			
			177MC (10MC Swp)		7			
			85MC (10MC Swp)		6			
			79MC (10MC Swp)		5			
			89MC (10MC Swp)		4			
			63MC (10MC Swp)		3			
			57MC (10MC Swp)		2			
13.	"	"	See Freq. Chart	"	Channels 14 thru 83	"		Check all UHF channels for response similar to Fig. 4. If necessary, SLIGHTLY retouch A5 and A6 to correct for any overall tilt that is approximately the same on all UHF channels. Remove test equipment and bias supplies.

KRK22C TUNER ALIGNMENT

An RF unit which is operative and requires only minor touch-up adjustments will require no presetting of adjustments. When complete alignment is necessary make the following pre-adjustments:

1. Preset A14 all the way out.
2. Set channels 7 to 13 oscillator slugs one turn from tight.
3. Adjust A10 so that the slug is all the way out.

Disconnect the link from terminals "A" and "B" of L26 and terminate the link with a 39Ω carbon resistor. Tuner alignment as outlined below requires the use of a heterodyne frequency meter. The limits of oscillator injection voltage are 2 volts minimum and 5.5 volts maximum measured at point (F) with VTVM.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

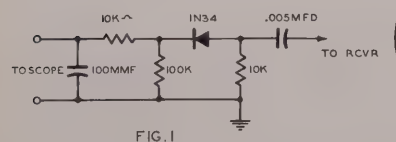

FIG. 1

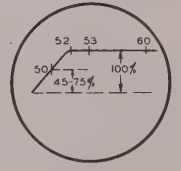

FIG. 2

FIG. 3

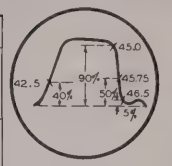

FIG. 4

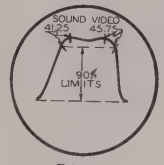

FIG. 5

FIG. 6

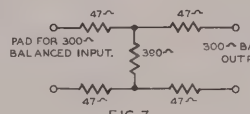

FIG. 7

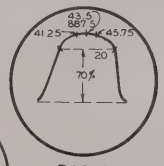

FIG. 8

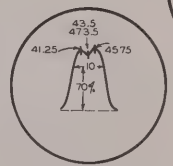

FIG. 9

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
14.	Direct	High side to point (A). Low side to chassis.	Not used	43.5MC (400~Mod)	2	Vert. Amp. to point (F). Low side to chassis.	A15	To be sure that 43.5MC trap is adjusted with zero bias short tuner AGC terminal to ground. Set scope gain to maximum. Adjust signal generator for maximum output. Adjust A15 for MINIMUM 400~ indication on scope. If necessary, A15 may be retouched in field to provide additional rejection of a specific frequency. Exercise care so that A15 is not tuned into channel 2 reducing that channel's sensitivity. Remove short from tuner AGC terminal to chassis.
15.		RF input of heterodyne frequency meter to end of insulated wire inserted in hole provided for adjustment of A18.	"	Set Freq. meter to 227MC	8	Not used	A17, A14	Connect potentiometer arm of one of the bias supplies to the tuner AGC terminal. Connect positive lead to chassis. Adjust for -3 volts at tuner AGC terminal. Preset A16 for -3 volts on VTVM at point (F). Turn fine tuning control maximum clockwise. Adjust A17 for audible beat on frequency meter. Adjust A14 clockwise until beat note just begins to change, then turn one full turn in same clockwise direction. Return fine tuning control to its mid-range position.
	NOTE: If channel 8 oscillator frequency cannot be reached by adjustment of A17, switch to channel 13 and adjust A19 for channel 13 oscillator frequency then switch to channel 12 and adjust A20 for channel 12 oscillator frequency. Continue down to channel 8 adjusting proper oscillator trimmer to obtain proper oscillator frequency on each channel. Also, on channel 8, adjust A17 for channel 8 oscillator frequency. Switch to channel 13 and adjust A19, then switch back to channel 8 and adjust A17 again.							
16.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	183MC (10MC Swp)	181.25MC 185.75MC	8	Vert. Amp. to point (F). Low side to chassis.	A31, A18, A32, A33	Set A10 fully counter clockwise. Set the scope gain to maximum and attenuate generator output for minimum input signal that will produce useable pattern on scope. Adjust for response similar to Fig.6. Adjust A33 for maximum amplitude between markers. A32 affects pass band. A31 affects tilt (when A33 is properly adjusted). A18 affects the response band width.
17.	Connect the DC probe of VTVM to point (F). Common to chassis. Adjust A16 for -3 volts at point (F). Repeat steps 16 and 17 until proper response is obtained.							
18.		Connect frequency meter as in step 15.	Not used	Frequency meter to 257MC	13	Not used	A19	Rotate fine tuning control maximum clockwise. Adjust A19 for audible beat on freq. meter. SLIGHTLY overshoot the adjustment an additional turn in the same direction, then adjust A14 to again obtain an audible beat.
19.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	"	Vert. Amp. to point (F). Low side to chassis.	A34, A35	Adjust for response similar to Fig. 6. Turn off generator and check oscillator injection voltage at point (F) using VTVM as in step 17. If A35 required readjustment, turn sweep generator back on and recheck channel 13 response. If necessary, retouch A34 and A35 for desired response.
20.		Connect frequency meter as in step 15.	Not used	Frequency meter to 227MC	8	Not used	A14	Check for audible beat on frequency meter. If necessary, adjust A14 for proper oscillator frequency.
21.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	183MC (10MC Swp)	181.25MC 185.75MC	"	Vert. Amp. to point (F). Low side to chassis.	A31, A18, A32, A33	If necessary, retouch A31, A18, A32 and A33 to obtain response similar to Fig.6. If A31 required adjustment turn off generator and switch back to channel 13 and check oscillator injection voltage as in step 17. If necessary, repeat steps 19, 20 and 21 until proper response is obtained.
22.		Connect frequency meter as in step 15.	Not used	Frequency meter to 139MC	6	Not used	A36	Set fine tuning control to its mid-range position. Adjust A36 for audible beat on frequency meter.
23.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead	85MC (10MC Swp)	83.25MC 87.75MC	"	Vert. Amp. to point (F). Low side to chassis.	A36, A37 A38	Adjust for response curve similar to Fig.5. Check oscillator injection voltage as in step 17. Readjust A16 if necessary.
24.	If A16 required adjustment switch receiver and generator to channel 8. Readjust A31 for response similar to Fig.6. Recheck A14 and A17 for proper oscillator frequency as in step 15.							
25.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	85MC (10MC Swp)	83.25MC 87.75MC	6	Vert. Amp. to point (F). Low side to chassis.		Check for response similar to Fig.6. Check oscillator injection voltage for each channel at point (F). If markers fall below 80% on any channel retouch A36, A37 and A38 to obtain response curves within proper limits.
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			
26.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response similar to Fig.6. Check oscillator injection voltage for each channel at point (F). If markers fall below 80% on any channel, retouch A18, A31 and A32 to obtain response curves within proper limits.
			207MC (10MC Swp)	205.25MC 209.75MC	12			
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			

RCA VICTOR MODELS
24-T-420, U, 24-T-435, U (Ch. KCS84C, E)

ALIGNMENT INSTRUCTIONS (cont)

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
27.		Connect frequency meter as in step 15.	Not used	257MC	13	Not used	A19	Adjust individual channel oscillator slug for audible beat on each channel. Recheck oscillator injection voltage on each channel at point (F) to verify that the voltage is within limits (2 volts mimimum and 5.5 volts maximum). Continue alignment with step 47.
				251MC	12		A20	
				245MC	11		A21	
				239MC	10		A22	
				233MC	9		A23	
				227MC	8		A24	
				221MC	7		A25	
				129MC	6		A26	
				123MC	5		A27	
				113MC	4		A28	
				107MC	3		A29	
				101MC	2		A30	

KRK29A/27 VHF TUNER ALIGNMENT

An RF unit which is operative and requires only minor touch-up adjustments will require no pre-setting of adjustments. When complete alignment is necessary make the following pre-adjustments.

1. Pre-set A14 all the way out.
2. Set channels 7 to 13 oscillator slugs one turn from tight.
3. Adjust A10 so that the slug is all the way out.

Disconnect the link from terminals "A" and "B" of the input IF transformer and terminate the link with a 39Ω carbon resistor.
Tuner alignment as outlined below requires the use of a heterodyne frequency meter. The limits of oscillator injection voltage are 2 volts minimum and 5.5 volts maximum measured at point (F) with VTVM.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
28.	Direct	High side to point (A). Low side to chassis.	Not used	43.5MC (400∿ Mod)	2	Vert. amp. to point (D). Low side to chassis.	A15	To be sure that the 43.5MC trap is adjusted with zero bias short tuner AGC terminal to ground. Set scope gain to maximum. Adjust signal generator for maximum output. Adjust A15 for MINIMUM 400∿ indication on scope. If necessary, A15 may be retouched in field to provide additional rejection at a specific frequency. Exercise care so that A15 is not turned into channel 2 reducing that channels sensitivity. Remove short from tuner AGC terminal.
29.		RF input of heterodune frequency meter to end of insulated wire inserted in hole provided for adjustment of A18.	"	Set freq. meter to 227MC	8	Not used	A17, A14	Connect the potentiometer arm of one of the bias supplies to tuner AGC terminal. Connect positive lead to chassis. Adjust for -3 volts at tuner AGC terminal. Pre set A16 for -3 volts on VTVM of point (F). Turn fine tuning control maximum clockwise. Adjust A17 for audible beat on frequency meter. Adjust A14 clockwise until beat note just begins to change then turn one full turn in same clockwise direction. Return fine tuning control to its midrange position.

NOTE If channel 8 oscillator frequency cannot be reached by adjustment of A17 switch to channel 13 and adjust A19 for channel 13 oscillator frequency the switch to channel 12 and adjust A20 for channel 12 oscillator frequency. Continue down to channel 8 adjusting proper oscillator trimmer to obtain proper oscillator frequency on each channel. Also on channel 8, adjust A17 for channel 8 oscillator frequency. Switch to channel 13 and adjust A19 then switch back to channel 8 and adjust A17 again.

30.	Two 130Ω carbon resistors	Across antenna terminals with 130Ω in each lead.	183MC (10MC Swp)	181.25MC 185.75MC	8	Vert. amp. to point (D). Low side to chassis.	A31, A18, A32, A33	Set A10 fully counter clockwise. Set the scope gain to maximum and attenuate generator output for minimum input signal that will produce useable pattern on scope. Adjust for response similar to Fig. 6. Adjust A33 for maximum amplitude between markers. A32 affects pass band. A31 affects tilt (when A33 is properly adjusted). A18 affects the response bandwidth.
31.	Connect the DC probe of VTVM to point (F). Common to chassis. Adjust A16 for -3 volts at point (F). Repeat steps 30 and 31 until proper response is obtained.							
32.		Connect frequency meter as in step 29.	Not used	Frequency meter to 257MC	13	Not used	A19	Rotate fine tuning control maximum clockwise. Adjust A19 for audible beat on frequency meter. SLIGHTLY overshoot the an additional turn in the same direction then adjust A14 to again obtain an audible beat.
33.	Two 130Ω carbon resistors	Across antenna terminals with 130Ω in each lead	213MC (10MC Swp)	211.25MC 215.75MC	"	Vert. amp. to point (D). Common to chassis.	A34, A35	Adjust for response similar to Fig. 6. Turn off generator and check oscillator. Injection voltage at point (F) using VTVM as in step 31. If A16 required readjustment, turn sweep generator back on and recheck channel 13 response. If necessary, retouch A34 and A35 for desired response.
34.		Connect frequency meter as in step 29.	Not used	Frequency meter to 227MC	8	Not used	A14	Check for audible beat on frequency meter. If necessary, adjust A14 for proper oscillator frequency.
35.	Two 130Ω carbon resistors	Across antenna terminals with 130Ω in each lead	183MC (10MC Swp)	181.25MC 185.75MC	8	Vert. amp. to point (D). Low side to chassis.	A31, A18, A32, A33	If necessary, retouch A31, A18, A32 and A33 to obtain response similar to Fig. 6. If A31 required adjustment turn off generator and switch back to channel 13 and check oscillator injection voltage as in step 31. If necessary, repeat steps 33, 34 and 35 until proper response is obtained.
36.		Connect frequency meter as in step 29.	Not used	Frequency meter to 129MC	6	Not used	A26	Set fine tuning control to its midrange position Adjust A26 for audible beat on frequency meter.
37.	Two 130Ω carbon resistors	Across antenna terminals with 130Ω in each lead.	85MC (10MC Swp)	83.25MC 87.75MC	6	Vert. amp. to point (D). Low side to chassis.	A36, A37 A38	Adjust for response curve similar to Fig. 6. Check oscillator injection voltage as in step 31. Readjust A16 if necessary.
38.	If A16 required readjustment switch receiver and generator to channel 8. Readjust A31 for response similar to Fig. 6. Recheck A14 and A17 for proper oscillator frequency as in step 29.							

ALIGNMENT INSTRUCTIONS (cont)

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
39.	Two 130Ω carbon resistors	Across antenna terminals with 130Ω in each lead.	85MC (10MC Swp)	83. 25MC 87. 75MC	6	Vert. amp. to point (D). Low side to chassis.		Check for response similar to Fig. 6. Check oscillator injection voltage for each channel at point (F). If markers fall below 80% on any channel, retouch A36, A37 and A38 to obtain response curves within proper limits.
			79MC (10MC Swp)	77. 25MC 81. 75MC	5			
			69MC (10MC Swp)	67. 25MC 71. 75MC	4			
			63MC (10MC Swp)	61. 25MC 65. 75MC	3			
			57MC (10MC Swp)	55. 25MC 59. 75MC	2			
40.	"	"	213MC (10MC Swp)	211. 25MC 215. 75MC	13	"		Check for response similar to Fig. 6. Check oscillator injection voltage for each channel at point (F). If markers fall below 80% on any channel, retouch A18, A31 and A32. to obtain response curves within proper limits.
			207MC (10MC Swp)	205. 25MC 209. 75MC	12			
			201MC (10MC Swp)	199. 25MC 203. 75MC	11			
			195MC (10MC Swp)	193. 25MC 197. 75MC	10			
			189MC (10MC Swp)	187. 25MC 191. 75MC	9			
			183MC (10MC Swp)	181. 25MC 185. 75MC	8			
			177MC (10MC Swp)	175. 25MC 179. 75MC	7			
41.		Connect frequency meter as in step 29	Not used	257MC	13	Not used	A19	Adjust individual channel oscillator slug for audible beat on each channel. Recheck oscillator injection voltage on each channel at point (F) to verify that the voltage is within limits (2 volts minimum and 5. 5 volts maximum)
				251MC	12		A20	
				245MC	11		A21	
				239MC	10		A22	
				233MC	9		A23	
				227MC	8		A24	
				221MC	7		A25	
				129MC	6		A26	
				123MC	5		A27	
				113MC	4		A28	
				197MC	3		A29	
				101MC	2		A30	

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KRK29A/27 UHF TUNER ALIGNMENT

Turn the change over switch to "UHF" position. The IF transformer (whose adjustment is A12) should be grounded by inserting a clip lead through the operature provided in the top of the tuner. Connect the other end of the clip lead to the tuner case .
It will be necessary to fabricate a test dial to fit over the split gear on the tuner shaft for accurate alignment. Reference marks at 0, 9 and 168 degrees should be scribed on the test dial. Locate 0 degree reference point by placing a 1/16" shim between the stop pin on the tuner and the stop plate on the gear assembly with the capacitor plates fully meshed.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
42.	300Ω Pad (See Fig. 7)	Across UHF antenna terminals thru 300Ω pad (See Fig. 7).	887.5MC (20MC Swp)	887.5MC 41.25MC 43.5MC 45.75MC	83 (Rotate tuning dial to 168°)	Vert. Amp. to point (G). Low side to chassis.	A39,A40	Connect the high side of VHF signal generator thru 1000Ω carbon resistor to rear terminal of 1N82 crystal holder and insert markers for 41.25MC, 43.5MC and 45.75MC. Adjust for maximum response similar to Fig. 8.
43.	"	"	"	"	"	"	A41	Adjust until 43.5MC marker coincides with 887.5MC marker with the 41.25MC and 45.75MC markers symmetrically located on response curve as shown in Fig. 8.
44.	"	"	473.5MC	473.5MC 41.25MC 43.5MC 45.75MC	14 (Rotate tuning dial to 9°)	"	A42,A43 A44	Adjust A42 and A43 for maximum response similar to Fig. 9. Adjust A44 until 43.5MC marker coincides with 473.5MC marker with 41.25MC and 45.75MC markers as shown on response curve in Fig. 9.

45. Repeat steps 42, 43 and 44 until proper responses are obtained. With perfect tracking the three markers will ride on top of the response curve. The markers may ride down the sides of the curve as far as the 70% point without seriously affecting the alignment. If the markers fall below 70% level, knifing of the RF plates becomes necessary to correct the mistracking. Two holes are provided on the left side of the tuner thru which the plates may be knifed. The plates should be knifed while tuning lower in frequency to avoid affecting the tracking above the point of knifing. A check of which section to knife may be made by touching the plates with the knifing tool while observing the response, then proceed to knife the proper section or both sections if required.

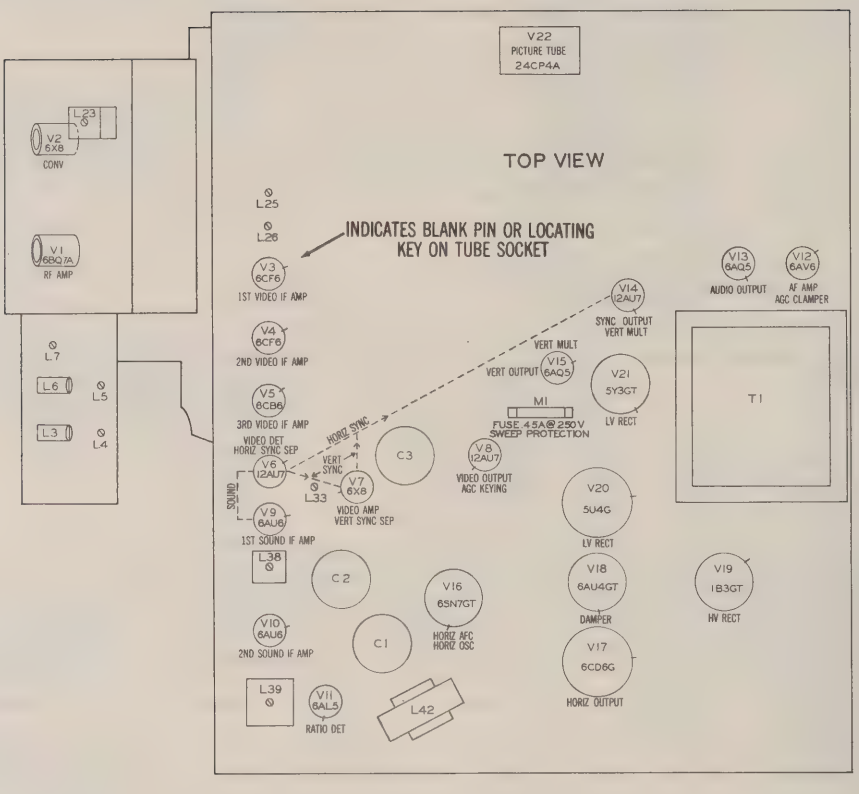
46. Connect the DC probe of a VTVM to point (G). Common to chassis. Set VTVM to 1.5 volts DC scale. Tune over entire range. Readings between .05 and 0.4 volts should be obtained. Voltages outside these limits indicate (a) low B+ voltage. (b) low or high crystal impednace (c) oscillator tube outside allowable limits. Connect the DC probe to point (H) (tuner bias terminal). Connect common to tuner chassis. VTVM should read between 0.5 and 2.5 volts. Readings out of this range will cause crystal currents outside allowable limits and in such cases replacement of the oscillator tube should follow. If the oscillator tube is replaced, recalibration of the high and low frequency end of the bands is required as outlined above.

SOUND IF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
47.	.001MFD	High side to pin 1 (grid) of 6AU6 (V9). Low side to chassis.	4.5MC (Unmod)	Any not used locally	DC probe to point (J) Common to chassis.	A45	Adjust for maximum deflection. Attenuate generator output so that A45 peaks at 6 volts on VTVM.
48.	"	"	"	"	DC probe to point (K) Common to chassis.	A46	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Repeat steps 47 and 48 making final adjustments with generator output set to produce 8 volts at point (J).
49.	"	"	"	"	DC probe to point (J) Common to chassis.	A47	Adjust for maximum deflection. Attenuate generator output so that A47 peaks at 6 volts.

continued on PAGE 19

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V20, V21**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V7, V8, V22**
Has pic, no sound - **V9, V10, V11, V12, V13**
Overloaded picture - **V8, V12**

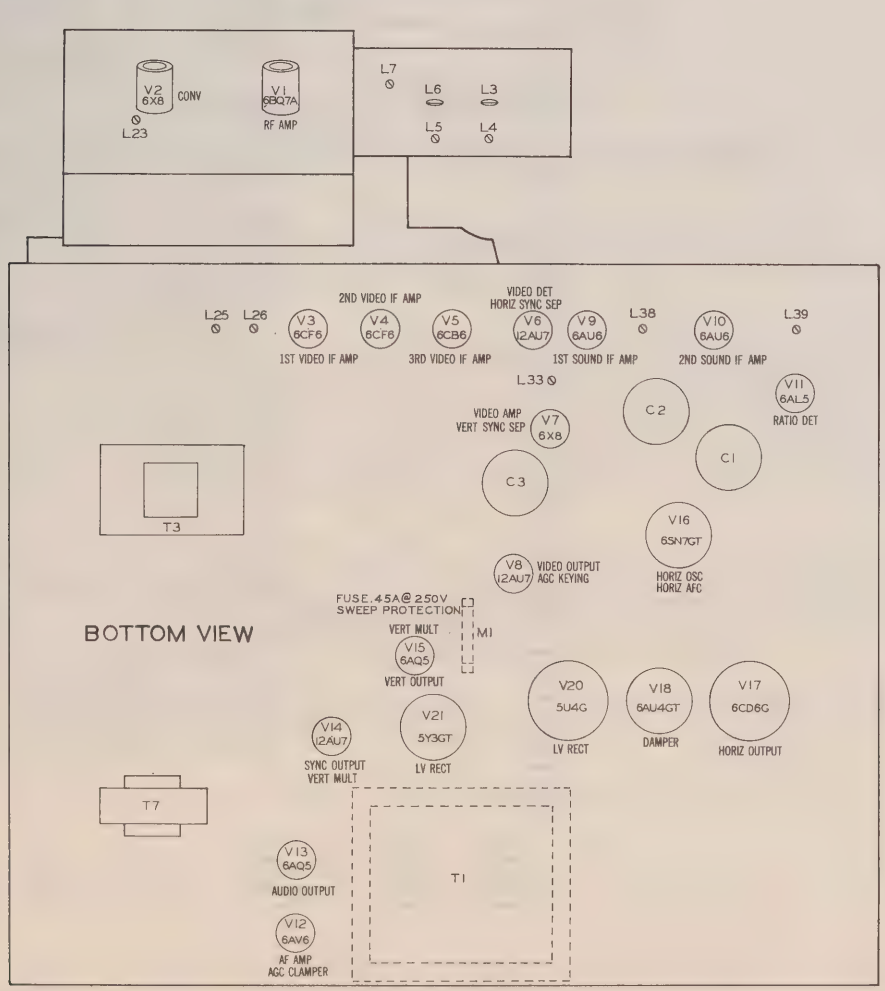
SYNC FAILURE
No vert. sync - **V6, V14**
No horiz. sync - **V7, V16**
No vert. or horiz. sync - **V14**

SWEEP FAILURE
No raster, has sound - **V16, V17, V18, V19, V22, Fuse (M1)**
No vertical deflection - **V14, V15**
Poor vert. linearity or foldover - **V14, V15**
Poor horiz. linearity or foldover - **V16, V17, V18**
Narrow picture - **V16, V17, V18, V19, V20, V21**
Vert. off freq. - **V6, V14**
Horiz. off freq. - **V7, V16**

RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7A	† 1. 5KΩ	500KΩ	600KΩ	0Ω	.1Ω	† 600KΩ	280K	120Ω	0Ω
V 2	6X8	0Ω	100KΩ	† 12. 5KΩ	0Ω	.1Ω	0Ω	100KΩ	† 15. 5KΩ	† 15. 5KΩ
V 3	6CF6	44KΩ	68Ω	0Ω	.1Ω	† 4. 8KΩ	† 4. 8KΩ	0Ω		
V 4	6CF6	43KΩ	33Ω	0Ω	.1Ω	† 4. 8KΩ	† 4. 8KΩ	0Ω		
V 5	6CB6	1. 1Ω	180Ω	.1Ω	0Ω	† 3. 8KΩ	† 3. 8KΩ	0Ω		
V 6	12AU7	2 Meg	3. 9KΩ	1. 3Ω	.1Ω	.1Ω	† 5. 6KΩ	† 27KΩ	330KΩ	0Ω
V 7	6X8	0Ω	2. 2Meg	† 1. 2Meg	.1Ω	0Ω	120Ω	3. 9KΩ	† 6KΩ	† 15. 5KΩ
V 8	12AU7	220KΩ	4. 1Meg	† 4. 3KΩ	.1Ω	.1Ω	† 7. 5KΩ	470KΩ	1. 7KΩ	0Ω
V 9	6AU6	1Ω	0Ω	0Ω	.1Ω	† 4. 3KΩ	† 4. 3KΩ	82Ω		
V 10	6AU6	120KΩ	0Ω	0Ω	.1Ω	† 10KΩ	† 5. 3KΩ	0Ω		
V 11	6AL5	10KΩ	10KΩ	0Ω	.1Ω	INF	0Ω	INF		
V 12	6AV6	10 Meg	0Ω	0Ω	.1Ω	2. 1Meg	2. 1Meg	† 330KΩ		
V 13	6AQ5	470KΩ	560Ω	0Ω	.1Ω	† 2. 2KΩ	† 1. 8KΩ	470KΩ		
V 14	12AU7	† 1KΩ	† 1. 5Meg	0Ω	.1Ω	.1Ω	▲ 1 Meg	1. 5 Meg	0Ω	0Ω
V 15	6AQ5	1 Meg	0Ω	.1Ω	0Ω	† 500Ω	† 43Ω	1 Meg		
V 16	6SN7GT	1. 4 Meg	† 16KΩ	410KΩ	400KΩ	† 47KΩ	0Ω	.1Ω	0Ω	
V 17	6CD6G	INF	.1Ω	47Ω	INF	1 Meg	2 Meg	0Ω	† 13. 5KΩ	TOP CAP ▲ 8. 5Ω
V 18	6AU4GT	INF	INF	900KΩ	INF	† 6. 8Ω	INF	0Ω	.1Ω	
V 19	1B3GT	PINS 1-8 HAVE INF. RESISTANCE								TOP CAP ▲ 410Ω
V 20	5U4G	INF	80KΩ	INF	10. 5Ω	INF	10Ω	INF	80KΩ	
V 21	5Y3GT	INF	80KΩ	INF	10Ω	INF	10. 5Ω	INF	80KΩ	
V 22	24CP4	0Ω	470KΩ	PINS 10 ▲ 330KΩ	PIN 11 † 180KΩ	PIN 12 .1Ω				

† MEASURED FROM PIN 2 OF V21.
▲ MEASURED FROM PIN 3 OF V18.



TUBE PLACEMENT CHART

SET 245 FOLDER 5

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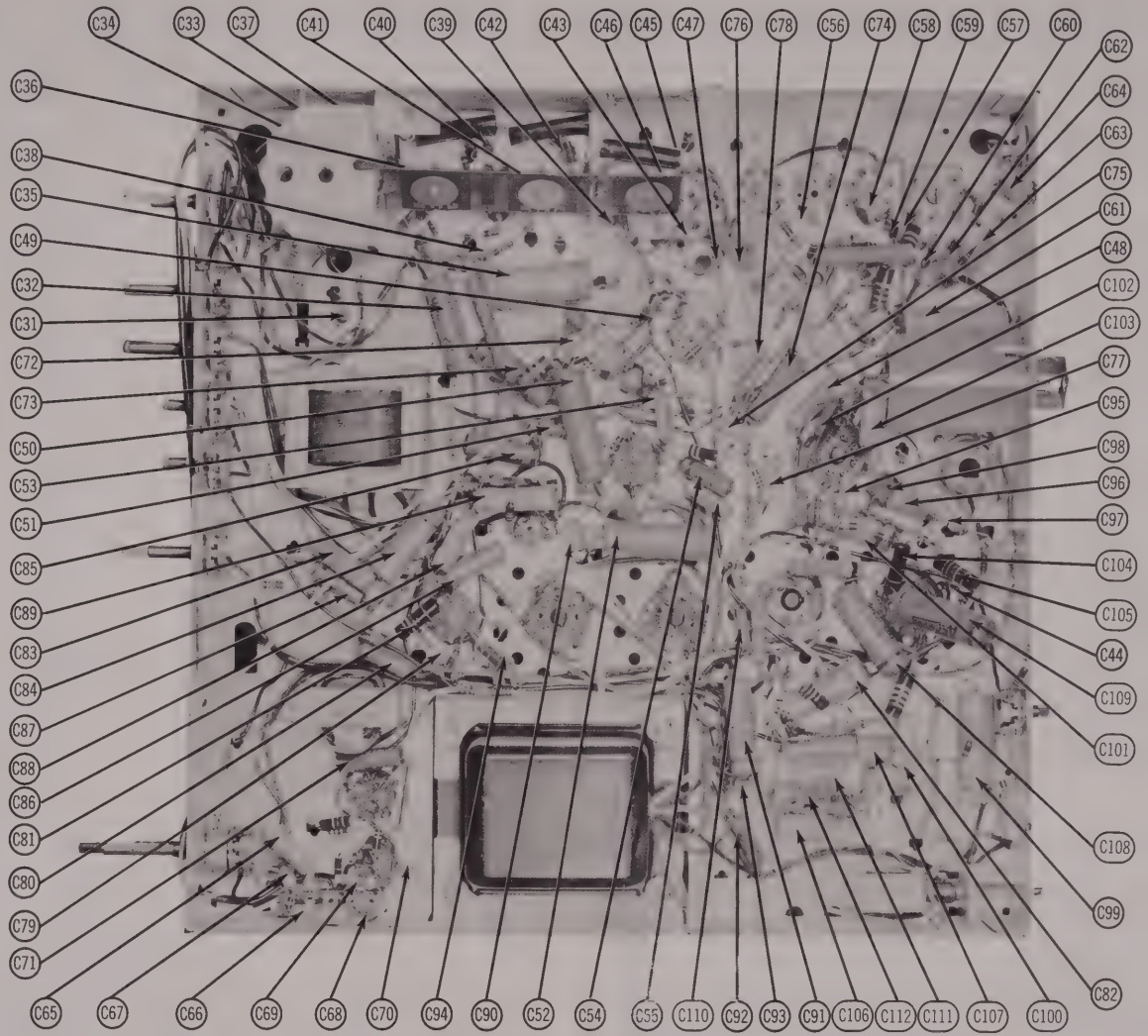

CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

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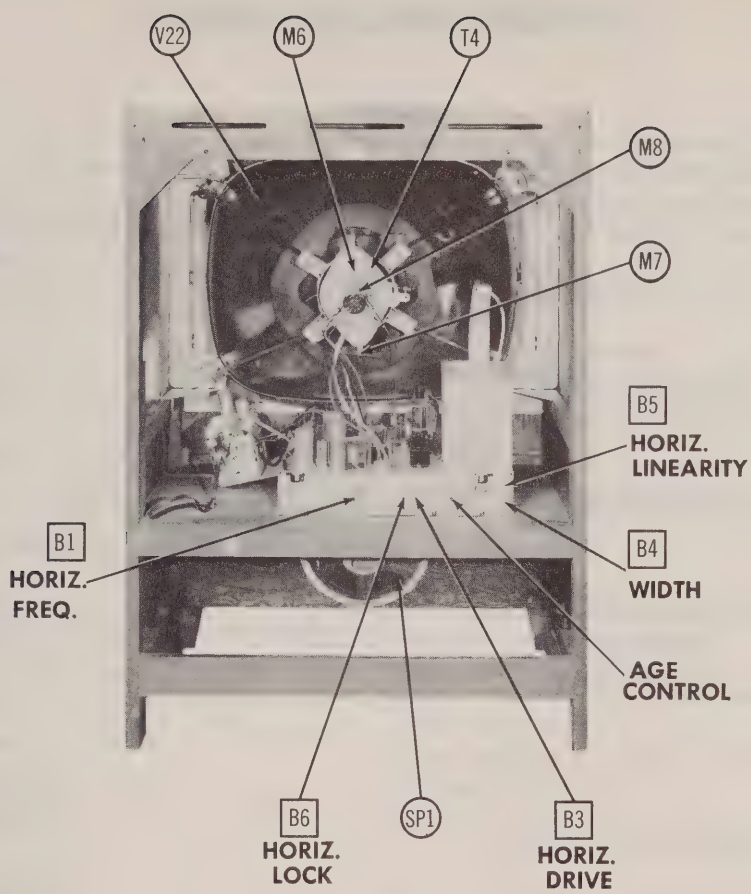

CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station,preferably a test pattern.
If the picture cannot be synchronized horizontally with the horizontal hold control, adjust the horizontal frequency slug (B1) until the picture will synchronize. If picture still will not synchronize, adjust the horizontal waveform slug (B2) several turns out of the coil and readjust B1 to synchronize the picture. If picture width or linearity is incorrect adjust the horizontal drive trimmer (B3) the width slug (B4) and the horizontal linearity slug (B5) for proper results.

HORIZONTAL WAVEFORM ADJUSTMENT

The horizontal waveform adjustment is made at the factory and normally will require no readjustment. B1 and B2 are adjusted simultaneously while watching the picture. Set the horizontal hold control fully clockwise. Turn B1 until the picture falls out of sync and 3 or 4 diagonal black bars sloping down to the right appear on the screen. Turn B2 clockwsie, at the same time adjusting B1 to maintain 3 or 4 bars on the screen. Continue adjusting B1 and B2 in that manner until the oscillator begins to motorboat, then adjust B2 counter clockwise until motorboating stops. To check adjustment turn B1 until picture synchronizes, then reverse the direction until the picture falls out of sync with diagonal bars sloping down to the right. Continue to turn B1 in the same direction. No more than 3 or 4 bars should appear on the screen. Instead the horizontal oscillator should start to motorboat. Retouch B2 until this condition is obtained.
To observe the horizontal waveform connect the low capacity probe of an oscilloscope to terminal "C" of L40. Turn the horizontal hold control 1/4 turn from the clockwise position so that picture is in sync. The waveform on the scope should appear on the scope as in Fig. 10 Adjust B2 for broad and narrow peaks of equal height as in Fig. 10. If necessary, keep the picture is sync with the horizontal hold control while adjusting B2.

HORIZONTAL LOCKING RANGE ADJUSTMENT

With the horizontal hold control in full counter clockwise position momentairly interrupt the signal by switching off channel and back again. If picture remains in sync turn B1 slightly and again switch off channel, repeating until picture loses sync with diagonal bars sloping down to the left. Slowly turn the horizontal hold control clockwise and note the least number of bars obtained just before the picture pulls into sync. If the number is more than 3 adjust the horizontal locking trimmer (B6) slightly clockwise. If the number is less than 2 adjust B6 counter clockwise. Recheck as above for the least number of bars and readjust B6, if necessary until 2 or 3 bars are present.
Turn the horizontal hold control fully clockwise and adjust B1 until the diagonal bar sloping down to the right appears on the screen, then reverse direction of adjustment of B1 until the diagonal bar just disappears leaving the picture in synchronization.

AGC CONTROL ADJUSTMENT

Connect the vertical amplifier of an oscilloscope to pin 9 (plate) of 6X8 (V7) video amplifier. Connect low side to chassis. Turn the AGC control fully counter clockwise. Tune in a strong TV signal and adjust the scope to see the video waveform . Turn the AGC control clockwise until the sync tips begin to be compressed, then counter clockwise just enough to remove the compression.

FM TRAP ADJUSTMENT

If interference from a strong FM station is encountered adjust A49 (on top of antenna matching transformer unit) for MINIMUM interference in the picture.

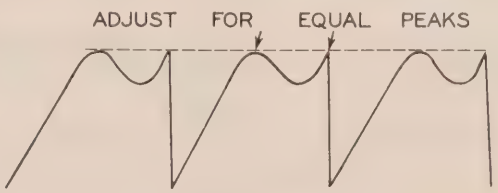

FIG. 10

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V16, V17, V18, V20 and V21. Check adjustments B3, B4, and B5. Check waveform W16.

If Satisfactory	If Unsatisfactory
Check T2, T4A, T5, T6, C111, C112, C110, R114, R113, and other associated circuit components.	Check R111, R108, C105, C102 and other associated components.

DRIVE LINES

Check by substitution V16, V17 and V18. Check adjustments B3, B4 and B5. Check T2 and T4A, C112, C110, R114, R113 and other associated components for failure or change of value.

COMPRESSED LEFT SIDE

Check adjustments B3, B4 and B5. Check by substitution V16, V17 and V18. Check components associated with the horizontal output and damper stages especially T2 and T4A.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check C99, C100 for open. Check V16, V17, V18, T2 and T4A for internal arcing.

XMAS TREE EFFECT

Substitute V16. Check B1 and B2. Check L40, C102, C103 and other associated circuit components.

VERTICAL

LOSS OF SWEEP

Check by substitution V14 and V15. Check waveform W11.

If Satisfactory	If Unsatisfactory
Check T3, C90, T4B and other associated components.	Check C86, C89, R122, R3A, R92 and other associated components.

INSUFFICIENT SWEEP

Check adjustments of height and vertical linearity controls. Proceed as outlined under "Loss of Sweep".

COMPRESSED AT BOTTOM

Check by substitution V14 and V15. Check T3, T4B, R116 and other associated circuit components.

COMPRESSED AT TOP

Check by substitution V14 and V15. Check T3, T4B, R93, R92, R4A, R91 and other associated circuit components.

FOLDS

Check by substitution V14 and V15. Check associated components for failure or change of value.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Substitute V14. Check C94, R81, R82, C74, C75 and other associated circuit components.

LOSS OF VERTICAL SYNC - HORIZONTAL SYNC SATISFACTORY

Check by substitution V14 and V15. Check waveform W10.

If Satisfactory	If Unsatisfactory
Check components associated with V14.	Check components associated with V7B. Check C81, R85, C80, R83 and other associated components.

LOSS OF HORIZONTAL SYNC - VERTICAL SYNC SATISFACTORY

Check by substitution V16. Check waveform W14.

If Satisfactory	If Unsatisfactory
Check components associated with V16, especially R97 and R6.	Check C95, C97, C99, R106, R101, R103 and other associated circuits components.

HORIZONTAL BENDING

Check by substitution V14, V16 and V17. Check C99, C100, R106 and other associated components.

VIDEO

LOSS OF VIDEO

Substitute V7 and V8. Check picture tube and components associated with V7 and V8.

SOUND BARS (4.5MC BEAT)

Adjust fine tuning for best picture and sound check adjustment (A48) and video IF alignment.

POOR CONTRAST

Substitute V6, V7 and V8. Check contrast control, picture tube and other associated circuit components.

NEGATIVE PICTURE

Check by substitution V8, V7, V6, V5, V4 and V3. Check AGC network. Check picture tube.

SMEAR

Substitute V7 and V8. Check L33, L34, L35, L36, R39, picture tube and other associated circuit components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V3, V4, V5, V6, V7 and V8 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V9, V10, V11, V12 and V13. Check stages V12 and V13 using audio signal generator. Apply audio signal across R1B.

If Satisfactory	If Unsatisfactory
Check ratio detector and audio IF alignment and components.	Check C67, C70, R68, R67, T7, speaker and other associated components.

BUZZ

Adjust fine tuning for best sound and picture. Adjust A46 for minimum buzz. If still unsatisfactory, substitute V11 and realign ratio detector and audio IF stages.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

TROUBLE SHOOTING AIDS (cont)

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POWER

DEAD SET

If filaments fail to light, check AC interlock assembly, switch on volume control and T1. If filaments light, substitute V20 and V21. Check TV and phono switch. Check B+ filter network and decoupling network components for failure or change of value.

SMALL AND/OR DIM PICTURE

Substitute V20 and V21. Check B+ filter decoupling network components.

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check fuse M1. Check by substitution V16, V17, V18 and V19. Check waveform W16.

If Satisfactory	If Unsatisfactory
Check T2, T5, T6, C111, C108, C104, T4A and other associated circuit components.	Check C105, C103, C102, L40, R107, R108, R114, R113 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V16, V17, V18, V19, V20 and V21. Check picture tube. Proceed as outlined under "Loss of High Voltage".

BLOOMING

Check by substitution V16, V17, V18, V19, V20 and V21. Check T2, T4A, R116, C112, C110 and other associated components.

GENERAL

RASTER SOUND NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER PICTURE NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER NO SOUND NO PICTURE

Check by substitution V3, V4, V5, V6, V7 and V8. Check tuner, video IF and video detector components. Check V1 and V2.

NO RASTER NO SOUND

Follow procedure outlined under "Dead Set".

NO RASTER SOUND HIGH VOLTAGE

Check R116 for open. If open, sound will be satisfactory, waveform will be present on picture tube grid and high voltage will be satisfactory.

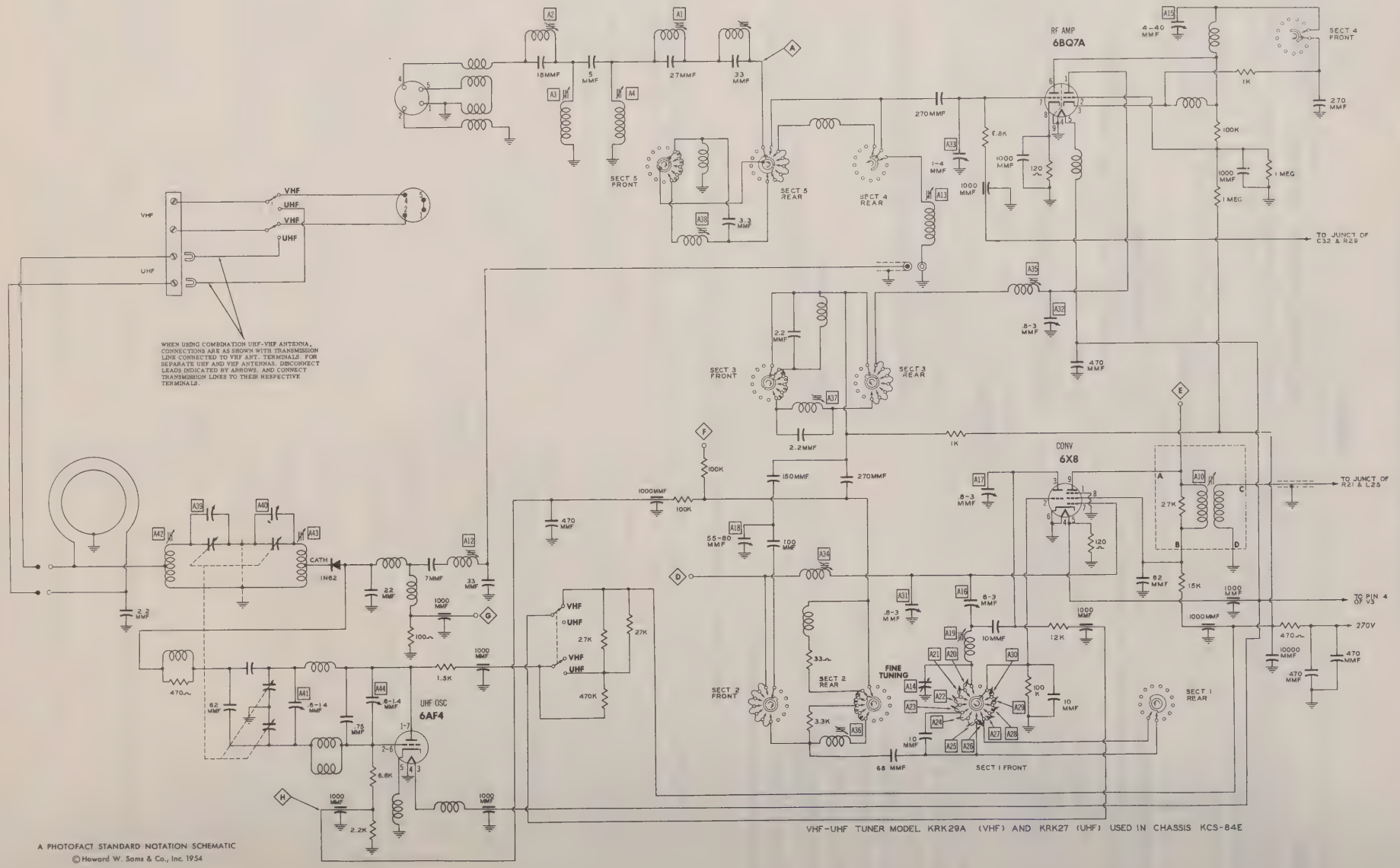
KEYSTONE EFFECT

Check T4A, T2, C112.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

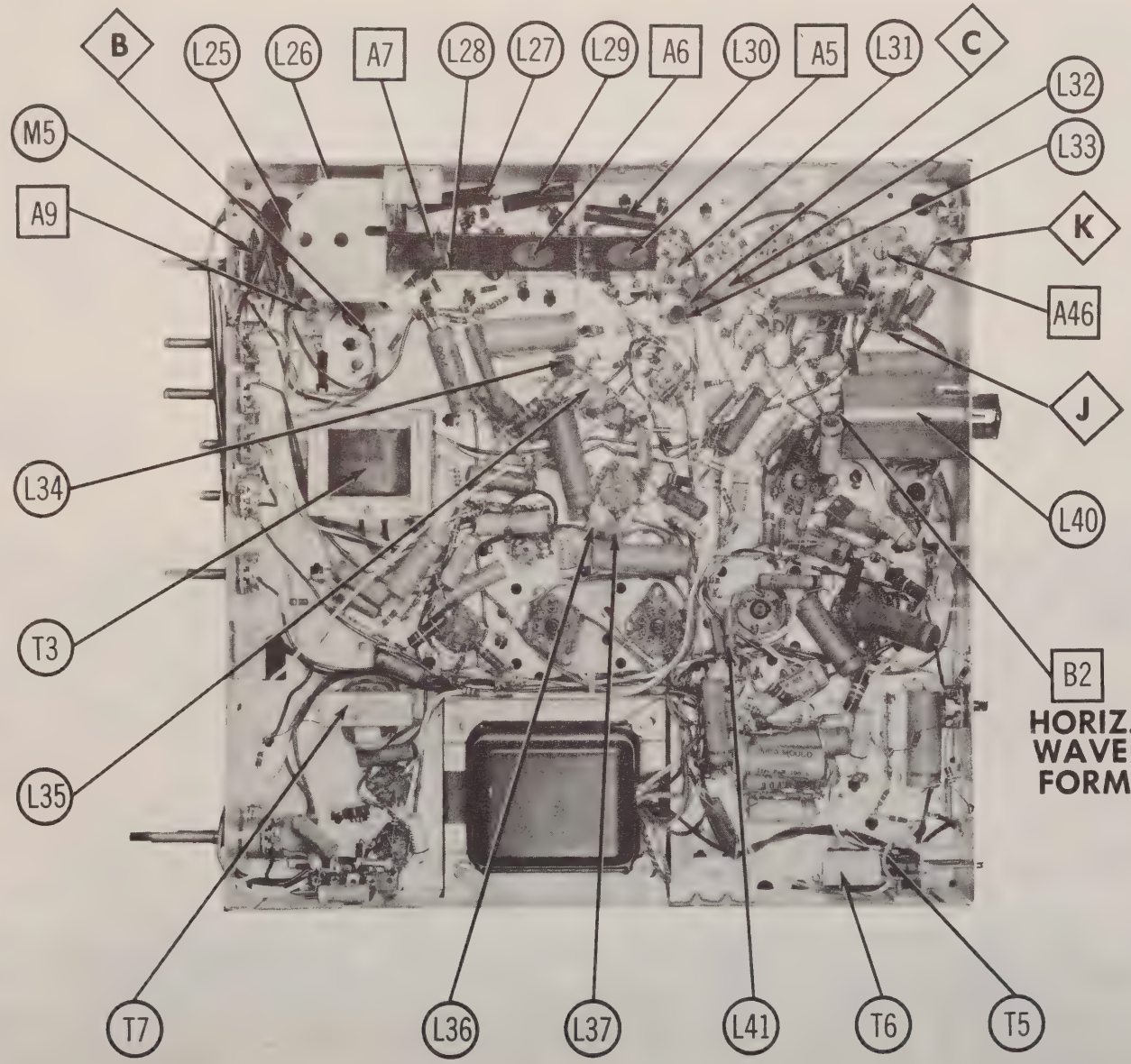
Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



VHF-UHF TUNER MODEL KRK29A (VHF) AND KRK27 (UHF) USED IN CHASSIS KCS-84E

A PHOTOFACT STANDARD NOTATION SCHEMATIC
©Howard W. Sams & Co., Inc. 1954

ALTERNATE TUNER SCHEMATIC



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

ALIGNMENT INSTRUCTIONS (cont)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

4.5MC TRAP ALIGNMENT

Short Pin 1 (grid) of 6CB6 (V5) to chassis to prevent noise from masking the output indication.

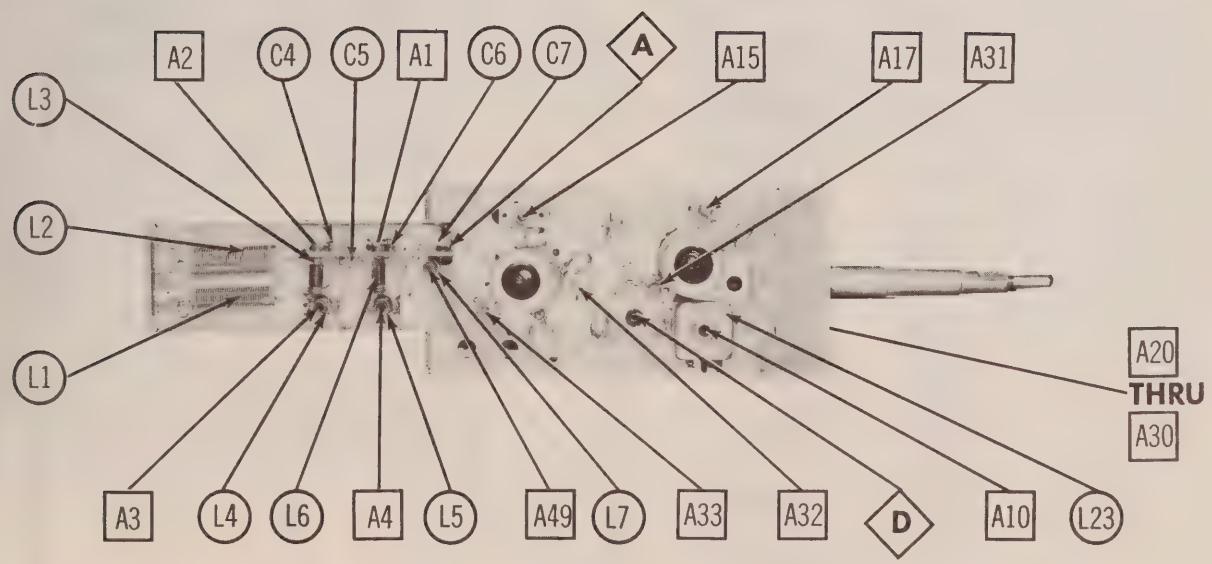
	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
50	1000Ω Resistor	High side thru 1KΩ to pin 2 (grid) of 12AU7 (V6). Low side to chassis.	4.5MC (400∿Mod)	Any	Vert. amp. thru detector (Fig.1) to pin 9 (plate) of 6X8 (V7). Low side to chassis.	A48	Adjust generator output for approximately 0.5 volts. Adjust A48 for MINIMUM 400∿ indication on scope. Remove short from pin 1 of V5.

ALTERNATE 4.5MC TRAP ADJUSTMENT

Tune in a TV station and inspect picture for evidence of 4.5 MC beat interference. If a 4.5MC beat is evident turn fine tuning control slightly to emphasize the beat then adjust A48 for MINIMUM 4.5MC beat interference in picture.

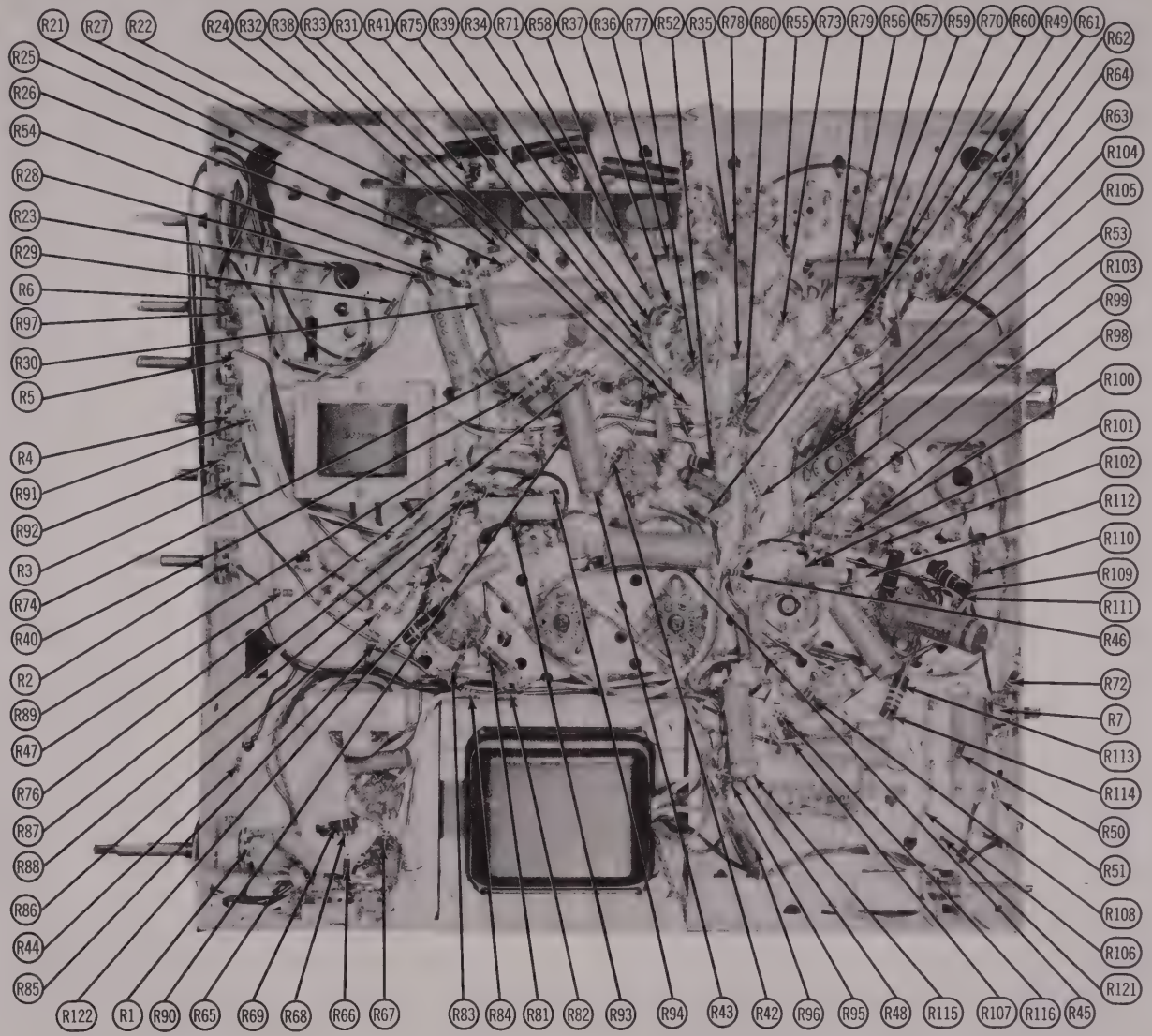
TELEVISION CHANNEL FREQUENCIES

Channel No.	Frequency Band (Mc)	Video Carrier	Sound Carrier	Channel No.	Frequency Band (Mc)	Video Carrier	Sound Carrier	Channel No.	Frequency Band (Mc)	Video Carrier	Sound Carrier	Channel No.	Frequency Band (Mc)	Video Carrier	Sound Carrier
2	54-60	55.25	59.75	23	524-530	525.25	529.75	44	650-656	651.25	655.75	64	770-776	771.25	775.75
3	60-66	61.25	65.75	24	530-536	531.25	535.75	45	656-662	657.25	661.75	65	776-782	777.25	781.75
4	66-72	67.25	71.75	25	536-542	537.25	541.75	46	662-668	663.25	667.75	66	782-788	783.25	787.75
5	76-82	77.25	81.75	26	542-548	543.25	547.75	47	668-674	669.25	673.75	67	788-794	789.25	793.75
6	82-88	83.25	87.75	27	548-554	549.25	553.75	48	674-680	675.25	679.75	68	794-800	795.25	799.75
7	174-180	175.25	179.75	28	554-560	555.25	559.75	49	680-686	681.25	685.75	69	800-806	801.25	805.75
8	180-186	181.25	185.75	29	560-566	561.25	565.75	50	686-692	687.25	691.75	70	806-812	807.25	811.75
9	186-192	187.25	191.75	30	566-572	567.25	571.75	51	692-698	693.25	697.75	71	812-818	813.25	817.75
10	192-198	193.25	197.75	31	572-578	573.25	577.75	52	698-704	699.25	703.75	72	818-824	819.25	823.75
11	198-204	199.25	203.75	32	578-584	579.25	583.75	53	704-710	705.25	709.75	73	824-830	825.25	829.75
12	204-210	205.25	209.75	33	584-590	585.25	598.75	54	710-716	711.25	715.75	74	830-836	831.25	835.75
13	210-216	211.25	215.75	34	590-596	591.25	595.75	55	716-722	717.25	721.75	75	836-842	837.25	841.75
14	470-476	471.25	475.75	35	596-602	597.25	601.75	56	722-728	723.25	727.75	76	842-848	843.25	847.75
15	476-482	477.25	481.75	36	602-608	603.25	607.75	57	728-734	729.25	733.75	77	848-854	849.25	853.75
16	482-488	483.25	487.75	37	608-614	609.25	613.75	58	734-740	735.25	739.75	78	854-860	855.25	859.75
17	488-494	489.25	493.75	38	614-620	615.25	619.75	59	740-746	741.25	745.75	79	860-866	861.25	865.75
18	494-500	495.25	499.75	39	620-626	621.25	625.75	60	746-752	747.25	751.75	80	866-872	867.25	871.75
19	500-506	501.25	505.75	40	626-632	627.25	631.75	61	752-758	753.25	757.75	81	872-878	873.25	877.75
20	506-512	507.25	511.75	41	632-638	633.25	637.75	62	758-764	759.25	763.75	82	878-884	879.25	883.75
21	512-518	513.25	517.75	42	638-644	639.25	643.75	63	764-770	765.25	769.75	83	884-890	885.25	889.75
22	518-524	519.25	523.75	43	644-650	645.25	649.75								



VHF TUNER TOP VIEW

SET 245 FOLDER 5



CHASSIS-BOTTOM VIEW-RESISTOR IDENTIFICATION

L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: RCA Victor PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	6BQ7A	6BQ7A	9AJ	
V2	Converter	6X8	6X8	9AK	
V3	1st. Video IF Amp.	6CF6	6CF6	7CM	
V4	2nd. Video IF Amp.	6CF6	6CF6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Detector-Horiz. Sync Sep.	12AU7	12AU7	9A	
V7	Video Amplifier Vert. Sync Sep.	6X8	6X8	9AK	
V8	Video Output-AGC Keying	12AU7	12AU7	9A	
V9	1st. Sound IF Amp.	6AU6	6AU6	7BK	
V10	2nd. Sound IF Amp.	6AU6	6AU6	7BK	
V11	Ratio Detector	6AL5	6AL5	6BT	
V12	AF Amp.-AGC Clamper	6AV6	6AV6	7BT	
V13	Audio Output	6AQ5	6AQ5	7BZ	
V14	Sync Amp.-Vert. Mult	12AU7	12AU7	9A	
V15	Vert. Mult.-Vert. Output	6AQ5	6AQ5	7BZ	
V16	Horiz. AFC - Horiz. Oscillator	6SN7GT	6SN7GT	8BD	
V17	Horiz. Output	6CD6G	6CD6G	5BT	
V18	Damper	6AU4GT	6AU4GT	4CG	
V19	HV Rectifier	1B3GT	1B3GT	3C	
V20	LV Rectifier	5U4G	5U4G	5T	
V21	LV Rectifier	5Y3GT	5Y3GT	5T	

PROPERTY OF
L. F. [illegible]SHIP
3928 [illegible] ST.
DENVER, COLORADO

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: RCA Victor PART No.	CBS-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V22	24CP4A	24CP4A 24TP4	24CP4A	24CP4A 24CP4		12N 12N 12N	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA: RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲80	400	77644	AFH2-63		C036		FP444.8	TVL-2673	
B	▲20	400								
C2A	▲100	400	78212	AFH2-91		C152		FP431.4	TVL-3672	
B	▲20	50								
C3A	30	50	78213	AFH3-136		C153		FP231	TVL-3637	
B	▲5	350						TC47		
C	■10	350								
C4	18		54207	SI18NP0	TCZ-18	TZ12	NP0K-180		5TCC-Q18	
C5	5		93056	SI5NP0	TCZ-4.7	TZ07	NP0K-050	ZT-555	5TCCB-V47	
C6	27		70935	SI27NP0	TCZ-27	TZ16	NP0K-270		5TCC-Q27	
C7	33		76793	SI33NP0	TCZ-33	TZ18	NP0K-330	ZT-5433	5TCC-Q33	
C8	270		75199	SI270	D6-271	TP41	GP2K-271	UC-5327	5GA-T27	
C9	1-4		76532		829-4		3115-01-10			
C10	1000		77084	EF-001	MFT-1000				503C-D1	
C11	470		7729 3	BPD-00047	D6-471	K060	801-471	UC-5347	5GA-T47	
C12	1000		77252	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C13	1000		77252	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C14	1-4		76532		829-4		3115-01-10			
C15	270		75199	SI270	D6-271	TP41	GP2K-271	UC-5327	5GA-T27	
C16	270		75199	SI270	D6-271	TP41	GP2K-271	UC-5327	5GA-T27	
C17	470			SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C18	10		77865	SI10NP0	TCZ-10	TZ09	NP0K-100	ZT-541	5TCC-Q1	
C19	.8-3				829-3		3115-01-0R5	CT565A		
C20	10		77865	SI10NP0	TCZ-10	TZ09	NP0K-100	ZT-541	5TCC-Q1	
C21	.8-3									
C22	.68				TCZ-.68	TZ02	NP0K-R68			
C23	10		77865	SI10NP0	TCZ-10	TZ09	NP0K-100	ZT-541	5TCC-Q1	
C24	1000		77252	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C25	1000		77084	EF-001	MFT-1000				503C-D1	
C26	10000		73960	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C27	470		77293	BPD-00047	D6-471	K060	801-471	UC-5347	5GA-T47	
C28	.8-3				829-3		3115-01-0R5	CT565A		
C29	1000		77084	EF-001	MFT-1000				503C-D1	
C30	470		77293	BPD-00047	D6-471	K060	801-471	UC-5347	5GA-T47	
C31	470		77293	BPD-00047	D6-471	K060	801-471	UC-5347	5GA-T47	
C32	.22	200	73794	P288-22		CUB2P22		PT4022	2TM-P22	
C33	15		39044	SI15N750	TCN-15	TN03	N750K-150	NT-5415	5TCU-Q15	
C34	470		77293	BPD-00047	D6-471	K060	801-471	UC-5347	5GA-T47	
C35	.47	200	73787	P288-47		CUB2P47		PT4047	2TM-P47	
C36	470		78622	BPD-00047	D6-471	K060	801-471	UC-5347	5GA-T47	
C37	470		77293	BPD-00047	D6-471	K060	801-471	UC-5347	5GA-T47	
C38	470		77293	BPD-00047	D6-471	K060	801-471	UC-5347	5GA-T47	
C39	470		78622	BPD-00047	D6-471	K060	801-471	UC-5347	5GA-T47	
C40	470		77293	BPD-00047	D6-471	K060	801-471	UC-5347	5GA-T47	
C41	1000		78623	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C42A	470		77672	BPD-00047	D6-471	K060	801-471	UC-5347	5GA-T47	
B	470			BPD-00047	D6-471	K060	801-471	UC-5347	5GA-T47	
C43	10000		73960	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C44	470		77293	BPD-00047	D6-471	K060	801-471	UC-5347	5GA-T47	
C45	470		77293	BPD-00047	D6-471	K060	801-471	UC-5347	5GA-T47	
C46	10		33098	SI10NP0	TCZ-10	TZ09	NP0K-100	ZT-541	5TCC-Q1	
C47	47	500		1469-00005		22R5Q47		MCF225	MS-45	
C48	.0039	400	79018			PM6D39				
C49	47		39042	SI47	D6-470	TP29	GP1K-470	UC-5447	5GA-Q47	
C50	.1	600	73557	P688-1	DF-104	CUB6P1		PT601	6TM-P1	
C51	.0027	600	73599			PM6D27				

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C52	.1	600	73557	P688-1	DF-104	CUB6P1		PT601	6TM-P1	
C53	680	1000	78796							
C54	.0022	400	73595	P688-0022	D6-222	CUB6D22	GP2-333-422	PT6222	6TM-D22	
C55	.001	600	75249	P688-001	D6-102	CUB6D1	GP21-102	PT621	6TM-D1	
C56A	10000		78991	BPD-2X01	DD3-103	DK062	81l-01	DC-511	5HX-2S1	
B	10000						81l-01	DC-511		
C57	10000		73960	BPD-01	DD-103	K082	81l-01	DC-511	5HX-81	
C58	10000		73980	BPD-01	DD-103	K082	81l-01	DC-511	5HX-81	
C59	470		77293	BPD-00047	D5-471	K060	80l-471	UC-5347	5GA-T47	
C60	470		77293	BPD-00047	D5-471	K060	80l-471	UC-5347	5GA-T47	
C61	.47	200	73787	P288-47		CUB2P47		PT4047	2TM-P47	
C62	470	500	73644	1469-0005		SR5T47		MCE245	MS-35	
C63	470	500	73644	1469-0005		SR5T47		MCE245	MS-35	
C64	.0022	600	73595	P688-0022	D6-222	CUB6D22	GP2-333-422	PT6222	6TM-D22	
C65	.0047	400	79017	P688-0047	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C66	.033	200	79015	P688-033		PM6S33		PT6133		
C67	.01	200	79014	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C68	.0027	600	73599			PM6D27				
C69	270		47617	SI270	D6-271	CUB6D271	GP3K-271	DC-5327	5GA-T27	
C70	.01	400	73561	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C71	.0027	1000	79020			PM1GD27		MCE245	MS-35	
C72	330	500	39640	1469-00035		SR5T33		MCE245	MS-35	
C73	.1	400	73551	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C74	.033	400	73552	P488-033		PM4S33		PT4133		
C75	180		71823							
C76	.0039	600	78221	P688-004	D6-402	CUB6D4	GP2-333-402	PT624	6TM-D4	
C77	.001	600	75249	1464-001		1R5D1		MCE255	MS-21	
C78	270	1000	78579							
C79	.0082	400	79019							
C80	.0027	600	73599			PM6D27				
C81	.0039	600	78221	1464-004		1R5D39		MCE463	MS-24	
C82	.1	400	73551	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C83	.01	600	73594	P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C84	.047	600	73592							
C85	.068	200	79016	P288-068		CUB4S68				
C86	.022	600	73798	P688-022	DF-203	CUB6S22	81l-02	PT6122	6TM-S22	
C87	.0027	600	73599			PM6D27				
C88	.015	400	73794							
C89	.027	600	75345							
C90	.001	1000	75643	P1088-001		CUB1D1		PT1621	MB-D1	
C91	.047	600	73592	P688-047	DF-503	CUB6S47		PT6147	6TM-S47	
C92	.0047	400	79017	P688-0047	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C93	.1	600	73551	P688-1	DF-104	CUB6P1		PT601	6TM-P1	
C94	220	500	39636	1469-00025		2R5T22		MCB240		
C95	82	1000	76474							
C96	.047	600	73553	P688-047	DF-503	CUB6S47		PT6147	6TM-S47	
C97	.001	600	75249	P688-001	D6-102	CUB6D1	GP2L-102	PT621	6TM-D1	
C98	.47	1000	79063							
C99	.47	200	73787	P288-47		CUB2P47		PT4047	2TM-P47	
C100	.022	400	73562	P488-022	DF-203	CUB4S22	81l-02	PT4122	4TM-S22	
C101	.1	400	73551	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C102	330	1000	78475							
C103	.01	600	73594							
C104	.001	600	75249	1464-001		1R5D1		MCE255	MS-21	
C105	.00068	600	76479			2R5T68				
C106	.022	1000	73810	P1088-022		CUB1S22		PT1622	MB-S22	
C107	.1	600	73557	P688-1	DF-104	CUB6P1		PT601	6TM-P1	
C108	.1	600	73557	P688-1	DF-104	CUB6P1		PT601	6TM-P1	
C109	.27	200	73786			PM4P27				
C110	270	1000	76579							
C111	.047	1000	73597	P1088-047		PM1D647		PT1647	MB-S47	
C112	.047	1000	73597	P1088-047		PM1D647		PT1647	MB-S47	
C113	180	3500	78575							
C114	120									

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA RCA Victor PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	10KΩ	½	78208	* QJ-504	RTY-443		UF14L	Constrast- Panel
B	1 Meg	½					UR16-T254 †	Volume tapped at 250KΩ - Rear
C	Switch					US-28		Attach to R1B
R2A	200KΩ	½	78209	Q1l-129	A47-200K-S	B-45	U-43	Brightness
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A
R3A	3.5Meg	½	78806	B1l-141	A47-5 Meg-S	AB-86	SU-59	Height
B	Shaft		Not Req.	TM-2 Kit	KS8-3	AK-1	Not Req.	Attach to R3A
R4A	2.5Meg	½	77807	B1l-239	A47-2.5Meg-S	AB-83	SU-585	Vert. Linearity
B	Shaft		Not Req.	TM-3 Kit	FKS-1/4	AK-1	Not Req.	Attach to R4A
R5A	1.5Meg	½	78210	Q1l-138	A47-2Meg-S	AB-75	U-155	Vert. Hold
B	Shaft		Not Req.	Not Req.	KS8-3	AK-4	Not Req.	Attach to R5A
R6A	75KΩ	½	77639	Q1l-125	A47-75K-S	AB-35	U-41	Horiz. Hold
B	Shaft		Not Req.	Not Req.	KS8-3	AK-4	Not Req.	Attach to R6A
R7A	500KΩ	½	78808	B1l-133	A47-500K-S	AB-59	SU-50	AGC
B	Shaft		Not Req.	TM-2 Kit	FKS-1/4	AK-1	Not Req.	Attach to R7A

* CONCENTRIKIT EQUIVALENT KIT K-2 BASE ELEMENTS & SHAFTS B17-1l6 & P1-200 (Panel)
B13-137X & R1-216 (Rear) & SWITCH 76-1

† Universal replacement (Mallory exact duplicate Part No. UE775S)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA RCA Victor PART No.	IRC PART No.	NOTES
R8	120Ω	½		BTS-120	
R9	6800Ω	½		BTS-6800	
R10	100KΩ	½		BTS-100K	
R11	1 Meg	½		BTS-1 Meg	
R12	1 Meg	½		BTS-1 Meg	
R13	1000Ω	½		BTS-1000	
R14	100KΩ	½		BTS-100K	
R15	100KΩ	½		BTS-100K	
R16	3300Ω	½		BTS-3300	
R17	100KΩ	½		BTS-100K	
R18	12KΩ	2		BTB-12K	
R19	15KΩ	2		BTB-15K	
R20	470Ω	½		BTS-470	
R21	1000Ω	½	503210	BTS-1000	
R22	15KΩ	½	503315	BTS-15K	
R23	1000Ω	½	503210	BTS-1000	
R24	68Ω	½	34763	BTS-68	
R25	43KΩ 5%	½	70351	BTS-43KΩ 5%	

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA RCA Victor PART No.	IRC PART No.	NOTES
R26	1000Ω	½	503210	BTS-1000	
R27	56KΩ 5%	½	502356	BTS-56K 5%	
R28	180KΩ 5%	½	11959	BTS-180K 5%	
R29	1.5Meg5%	½	503515	BTS-1.5 Meg 5%	
R30	3800Ω	7	77671		
R31	33Ω 5%	½	30789	BTS-33 5%	
R32	1000Ω	½	503210	BTS-1000	
R33	1.5 Meg	½	503515	BTS-1.5 Meg	
R34	180Ω 5%	½	502118	BTS-180 5%	
R35	3900Ω 5%	½	502339	BTS-3900 5%	
R36	12KΩ	½	503312	BTS-12K	
R37	3.9Meg	½	502539	BTS-3.9Meg	
R38	120Ω	½	503112	BTS-120	
R39	12KΩ	½	503312	BTS-12K	
R40	18KΩ	2	533318		
R41	5600Ω	½	503256	BTS-5600	
R42	470KΩ	½	504447	BTS-470K	
R43	180Ω	½	502118	BTS-180	
R44	270Ω	½	503127	BTS-270	
R45	7500Ω 5%	2	532275		
R46	470KΩ	½	504447	BTS-470K	
R47	220KΩ	½	503422	BTS-220K	
R48	100KΩ	½	504410	BTS-100K	
R49	3.9Meg	½	502539	BTS-3.9Meg	
R50	470KΩ	½	504447	BTS-470K	
R51	390KΩ	½	503439	BTS-390K	
R52	47KΩ	1	514347	BTA-47K	
R53	68KΩ	½	503368	BTS-68K	
R54	150KΩ	½	502415	BTS-150K	
R55	82Ω	½	503082	BTS-82	
R56	1000Ω	1	513210	BTA-1000	
R57	3300Ω	7	77670		
R58	470Ω 5%	½	504147	BTS-470	
R59	1000Ω	½	504210	BTS-1000	
R60	10KΩ	2	523310	BTB-10K	
R61	47Ω	½	503047	BTS-47	
R62	39KΩ	½	503339	BTS-39K	
R63	10KΩ 5%	½	502310	BTS-10K 5%	
R64	10KΩ 5%	½	502310	BTS-10K 5%	
R65	12KΩ	½	503312	BTS-12K	
R66	10 Meg	½	504610	BTS-10 Meg	
R67	330KΩ	½	504433	BTS-330K	
R68	470KΩ	½	504447	BTS-470K	
R69	560Ω	1	513156	BTA-560	
R70	1800Ω	2	523216	BTB-1800	
R71	10KΩ	½	503310	BTS-10K	
R72	680KΩ	½	30562	BTS-680K	
R73	5600Ω	½	503256	BTS-5600	
R74	68KΩ	½	503368	BTS-68K	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA RCA Victor PART No.	IRC PART No.	NOTES
R75	18KΩ	½	503318	BTS-18K	
R76	270KΩ	½	503427	BTS-270K	
R77	2.2Meg	½	503522	BTS-2.2Meg	
R78	39KΩ	½	503339	BTS-39K	
R79	1.2 Meg	½	503512	BTS-1.2 Meg	
R80	47KΩ	½	503347	BTS-47K	
R81	5600Ω	1	513256	BTA-5600	
R82	2200Ω 5%	½	502222	BTS-2200 5%	
R83	22KΩ	½	503322	BTS-22K	
R84	18KΩ	½	503318	BTS-18K	
R85	18KΩ	½	503318	BTS-18K	
R86	22KΩ	½	503322	BTS-22K	
R87	33KΩ 5%	½	502333	BTS-33K 5%	
R88	15KΩ 5%	½	39714	BTS-15K 5%	
R89	390KΩ	½	503439	BTS-390K	
R90	12KΩ	½	503312	BTS-12K	
R91	390KΩ 5%	½	502439	BTS-390K 5%	
R92	390KΩ 5%	½	502439	BTS-390K 5%	
R93	470KΩ	½	503447	BTS-470K	
R94	22KΩ 5%	½	71986	BTA-22K 5%	
R95	3300Ω	½	503233	BTS-3300	
R96	15KΩ	½	503315	BTS-15K	
R97	100KΩ	½	503410	BTS-100K	
R98	330KΩ	½	503433	BTS-330K	
R99	82KΩ	½	503382	BTS-82K	
R100	820KΩ	½	503482	BTS-820K	
R101	330KΩ	½	503433	BTS-330K	
R102	150KΩ	½	503415	BTS-150K	
R103	150KΩ 5%	1	513415	BTA-150K 5%	
R104	15KΩ	½	503315	BTS-15K	
R105	1. 8Meg5%	½	39063	BTA-1. 8Meg 5%	
R106	3900Ω	½	503239	BTS-3900	
R107	820KΩ	½	503482	BTS-820K	
R108	47KΩ 5%	1	513347	BTA-47K 5%	
R109	2.2 Meg	½	504522	BTS-2.2Meg	
R110	1 Meg	½	503510	BTS-1 Meg	
R111	47Ω	½	504647	BTS-47	
R112	47Ω	2	78797		
R113	27KΩ	2	523327	BTB-27K	
R114	27KΩ	2	523327	BTB-27K	
R115	56KΩ	½	503356	BTS-56K	
R116	270KΩ	½	503427	BTS-270K	
R117	1.5Ω	½	78795		
R118	1000Ω	½	503210	BTS-1000	
R119	560Ω	½		BTS-560	
R120	560Ω	½		BTS-560	
R121	100KΩ	½	504410	BTS-100K	
R122	470KΩ	½		BTS-470K	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA RCA Victor PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC ② 2A	536VCT .280ADC	5VAC ② 5A	78805	P-8167③④		R-61BC①②			
	SEC. 3	SEC. 4	SEC. 5							
	6.3VAC ②10.8A									

① Tape 6.3V ② 1.2A winding.
② Parallel and phase 6.3V ② 7A windings for Sec. 3.
③ Drill new mounting holes.
④ Parallel and phase 6.3V windings.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA RCA Victor PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T2	Horiz. Output Trans.	78810	A-8137 * ①	HV0-9 * ①	D-19 * ①		FB411 *①	
T3	Vert. Output Trans.	78809	A-8145 ②	A-3038②	A-108X②		Z1802②	26853②
T4A	Yoke-Horiz.(11.5MH)	78869⑥		MDF-90③	Y-50-1			Y-14
B	Yoke-Vert.(39MH)							
T5	Horiz. Linearity (2.8-8.5MH)	76442	WC-8	MWC-6④	WC-12⑤			WC-18④
T6	Width (2.8-18MH)	76441	WC-5 ④⑤	MWC-1④	WC-12⑤		RF800④ ⑤	WC-20④ ⑤

① Drill new mounting holes.
② Connect as auto transformer.
③ Use original yoke network.
④ Enlarge mounting hole.
⑤ Connect to coded red and blue terminals.
⑥ Includes 8 contact male connector.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

	ORIGINAL TERMINAL CONNECTIONS	Stancor Replacement Connections	Merit Replacement Connections	Triad Replacement Connections	RCA Replacement Connections	Halldorson Replacement Connections
	5	7	9	9		9
	4	4	8	7 & 8		8
	3	T	7 or 5	5		7 or 5
	2	3	3	3		3
	1	1	1	1		1
Connect Width Coil Across ▬▬	2 & 1	3 & 1	3 & 1	3 & 1		3 & 1

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA RCA Victor PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T7	7KΩ	3.4Ω	76997	A-3878 ①	A-3020	S-5X ①	Z1113 ①	T-36848 ①	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA RCA Victor PART No.	VIKING PART No.	QUAM PART No	NOTES
SP1	10"	PM	3.4Ω	77777	10711	10A31	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA RCA Victor PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Matching Coil	.8Ω	.8Ω	73591				Note 1
L2	Ant. Matching Coil	.6Ω	.8Ω	73591				
L3	IF Trap	0Ω		78542				Includes core
L4	Ant. Shunt Coil	0Ω		76538				Includes core
L5	Ant. Shunt Coil	0Ω		76537				Includes core
L6	IF Trap	0Ω		78541				Includes core
L7	FM Trap	0Ω		78540				Includes core, core part #76543
L8	Ant. Coils	0Ω		78802				Includes stator complete with rotor, coils (also L9)
L9	Ant. Coil	0Ω		73458				Channel 6, core part #77916
L10	Ant. Coil	0Ω		77859				
L11	Fil. Choke	0Ω		77206				
L12	Neutr. Coil	0Ω		78562				
L13	IF Trap Coil	.3Ω		78466				
L14	RF Coil	0Ω		77821				Channel 13, core part #77914
L15	RF Coils	0Ω		78801				Includes stator complete with rotor, coils (also L14 & L16), C16, R13
L16	RF Coil	0Ω		73460				Channel 6, core part #77916
L17	Fil. Choke	0Ω		79067				
L18	Mixer Grid Coil	0Ω		77919				Channel 13, core part #77914
L19	Mixer Grid Coils	0Ω		78800				Includes stator complete with rotor, coils (also L18 & L20), C15, C17, C22, R14, R15, R16
L20	Mixer Grid Coil	0Ω		73874				Channel 6, core part #77916
L21	Osc. Coil	0Ω		77915				Channel 13, core part #77914
L22	Osc. Coils	0Ω		77911				Includes stator, complete with rotor, coils (also L21), C21
L23	Conv. Plate	.3Ω	.1Ω	78399				Includes 27KΩ resistor
L24	Fil. Choke	0Ω		79067				
L25	47.25MC Trap	.1Ω		78204	20-1047		6219 *	
L26	1st. Video IF	.1Ω	.2Ω	78203	17-4523		6219	
L27	Fil. Choke	0Ω		73477	19-3001	TV-189	4804	1 Microhenry
L28A	2nd. Video IF	1.3Ω	1.3Ω					
B	3rd. Video IF	1.1Ω	1.1Ω	78743 *				
C	4th. Video IF	1.3Ω	1.3Ω					
L29	Fil. Choke	0Ω		73477	19-3001	TV-189	4804	1 Microhenry
L30	Fil. Choke	0Ω		73477	19-3001	TV-189	4804	1 Microhenry
L31	Series Peaking Coil	7.5Ω		75253	19-3125		6153	120 Microhenries
L32	Shunt Peaking Coil	11Ω		71526	19-3250	TV-185	6181	250 Microhenries
	4.5MC Trap	2.1Ω		76983	20-1004	TV-151	1470	RCA part number includes C47.
L33	Series Peaking Coil	7Ω		77674	19-3250 †	TV-185 †	6181 †	250 Microhenries, wound on 27KΩ resistor

RCA VICTOR MODELS
24-T-420, U, 24-T-435, U (Ch. KCS84C, E)

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: RCA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L35	Shunt Peaking Coil	11Ω		78222	19-3250 ■	TV-185 ■	6181 ■	250 Microhenries, wound on 6.8KΩ resistor
L36	Series Peaking Coil	4.8Ω		71529	19-3125 ▲	TV-182	6178	120 Microhenries, wound on 22KΩ resistor
L37	Shunt Peaking Coil	11Ω		75252	19-3500	TV-188	6174	500 Microhenries
L38	Sound IF	1.3Ω		76981	17-1071			Includes 22MMF Cap. & 120KΩ resistor
L39	Ratio Det.	8.5Ω	.5ΩCT	77112	17-1033	TV-110	1468	Tertiary winding-.2Ω
L40	Horiz. Osc.	80Ω		76440	20-1402	TV-162	6183	Pri. tapped @ 57Ω, horiz. waveform winding-46Ω
L41	RF Choke	.72Ω		76640	19-1001		4604	1.5 Microhenries, IRC part #CL-1

Note 1. Complete ant. matching trans. (part #78396), includes L1 and L2.
♦ Video IF printed circuit, replaceable as a whole unit.
* Use one winding only.
† Parallel with 27KΩ resistor
■ Parallel with 6.8KΩ resistor
▲ Parallel with 22KΩ resistor

FILTER CHOKE

ITEM No.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D. C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA: RCA Victor PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L42	.280ADC	38Ω	1.38HY	77676	C-2326 ①	C-2996 ①	C-17X ①	C5037 ①	T-26C44 ①

① Drill one new mounting hole.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA: RCA Victor PART No. FUSE	RCA Victor PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	43AG	.45A 250V	78798	78218	312.500 (3AG-1/2A)	357001	AGC 45/100	4405

MISCELLANEOUS

ITEM No.	PART NAME	RCA Victor PART No.	NOTES
M2	Dial light	11765	# 51 bayonet
M3A	Tuner		KRK-22C VHF
B	Tuner		KRK-29A VHF
M4	Tuner		KRK-27 UHF (used with KRK-29A)
M5	Switch	78211	TV-phono-tone
M6	Focus magnet	77867	Includes centering device
M7	Correction magnet	78556	2 used
M8	Ion trap	76141	
A9	Trimmer cap	78220	1st IF coupling 5-70MMF
B3,B6	Trimmer cap	75217	Horiz. lock & horizontal drive dual 10-160MMF
	Knob	77709	Brightness-brown (outer)
	Knob	77699	Brightness-brown
	Knob	77719	Brightness-med. beige
	Knob	77708	Channel selector
	Knob	77707	Fine tuning-brown (KRK22C tuner-outer)
	Knob	77717	Fine tuning-med. beige (KRK22C tuner-outer)
	Knob	77718	Picture - med. beige (outer)
	Knob	77736	TV-phono- med. beige
	Knob	77735	TV-phono-brown
	Knob	77710	Volume (inner)
	Safety glass	78872	

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF Tuner Oscillator Circuit may be accomplished by removing the Channel Selector and Fine Tuning knobs.

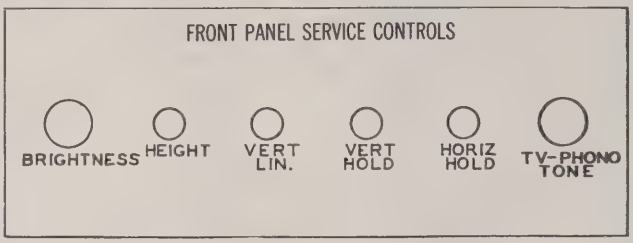
PICTURE TUBE SAFETY GLASS CLEANING

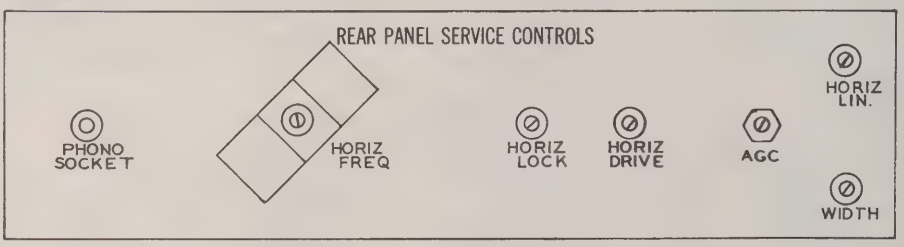
For picture tube safety Glass cleaning, it is necessary to remove chassis. (See disassembly instructions.)

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions.)

SERVICE ADJUSTMENT LOCATION





HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the Horiz. Oscillator Circuit can be made from the rear panel of the chassis. Set the Horiz. Hold Control at the Mid-position of its range and adjust the Horiz. Freq. slug (L40) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate Sound IF Detector Buzz, adjust the Ratio Detector Secondary (L39) located on bottom of chassis. (See tube placement chart.) Removal of chassis is necessary to adjust.

FUSES

One fuse is used for Horiz. Sweep Circuit protection. For location see Tube Placement Chart.)

CENTERING

Centering is accomplished mechanically by means of a centering lever on the P. M. Focusing assembly. Adjust the centering lever from side to side, and up and down until the picture is properly centered.

ANTI-PIN CUSHION ADJUSTMENT

Reduce the picture size so that the sides of the raster are visible, and position the magnets so that all sides are straight lines and the corners are at right angles.

DISASSEMBLY INSTRUCTIONS

1. Remove 6 push on type control knobs from front panel.
2. Disconnect built-in antenna and transmission lines.
3. Remove 2 wood screws and 2 metal clips. Remove rear cover.
4. Disconnect speaker leads, yoke plug, CRT socket and H. V. plug.
5. Remove 5 chassis bolts. Remove chassis.
6. Remove 3 speaker nuts. Remove speaker.

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MODEL 4140E

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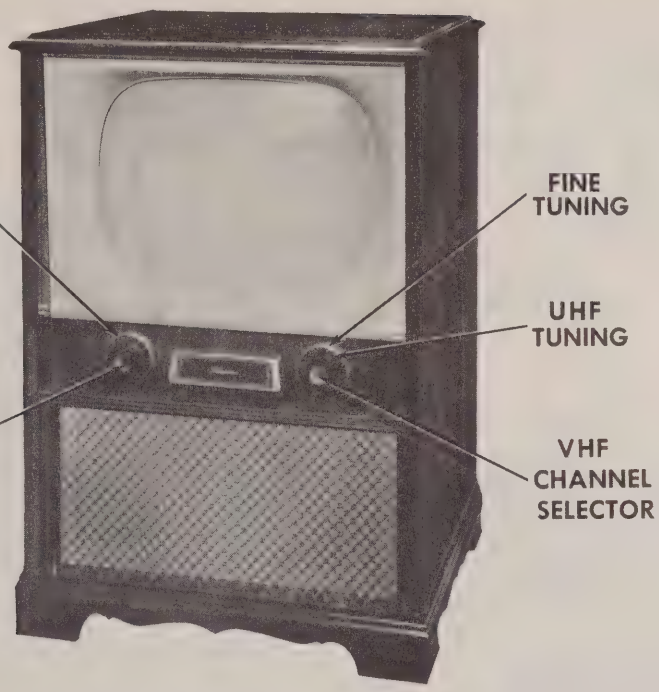

SILVERTONE MODEL 4140E

TRADE NAME	Silvertone	MODELS	CHASSIS
		3104A	528.271-3, -4
		4108	528.271
		4108A, 4125	528.271-1, -2, -3, -4
		4112, 4113B, 4118C, 4119A, 4127D, 4129B	528.303, -1
		4113A	528.292-1
		4118B	528.292-1, -2, -3
		4127C, 4129A, 4135	528.292, -1
		4133	528.292-2, -3
		4140E,	528.300, -2
		4150E, 4155E	528.300-2
SUPPLIER	Sears Roebuck & Co., 925 S. Homan Ave., Chicago, Illinois		
TYPE SET	Television Receiver		
TUBES	Twenty-two		
POWER SUPPLY	110-120 Volts AC-60 Cycle	RATING 1.64 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

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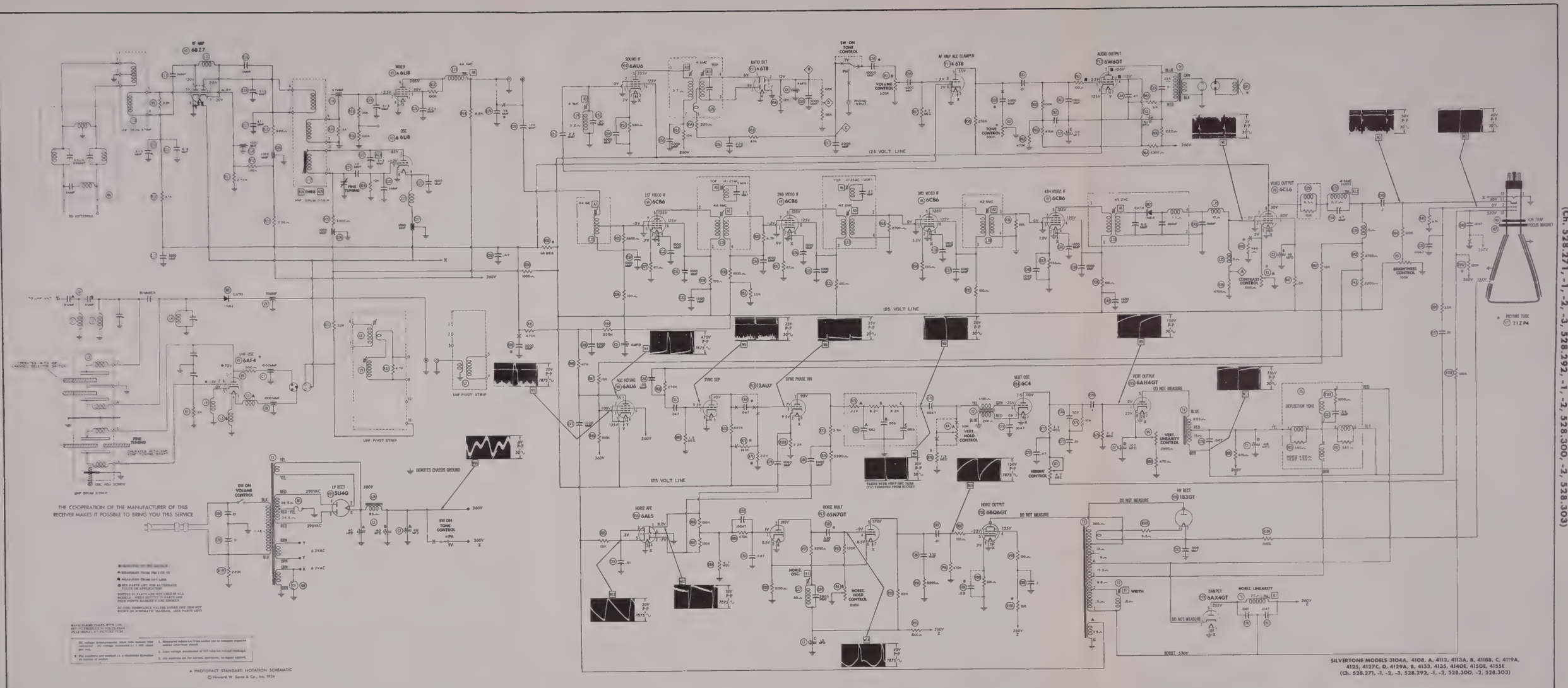

SILVERTONE MODELS 3104A, 4108, A, 4112, 4113A, B, 41188, C, 4119A, 4125, 4127C, D, 4129A, B, 4133, 4135, 4140E, 4150E, 4155E (Ch. 528.271, -1, -2, -3, 528.292, -1, -2, 528.300, -2, 528.303)

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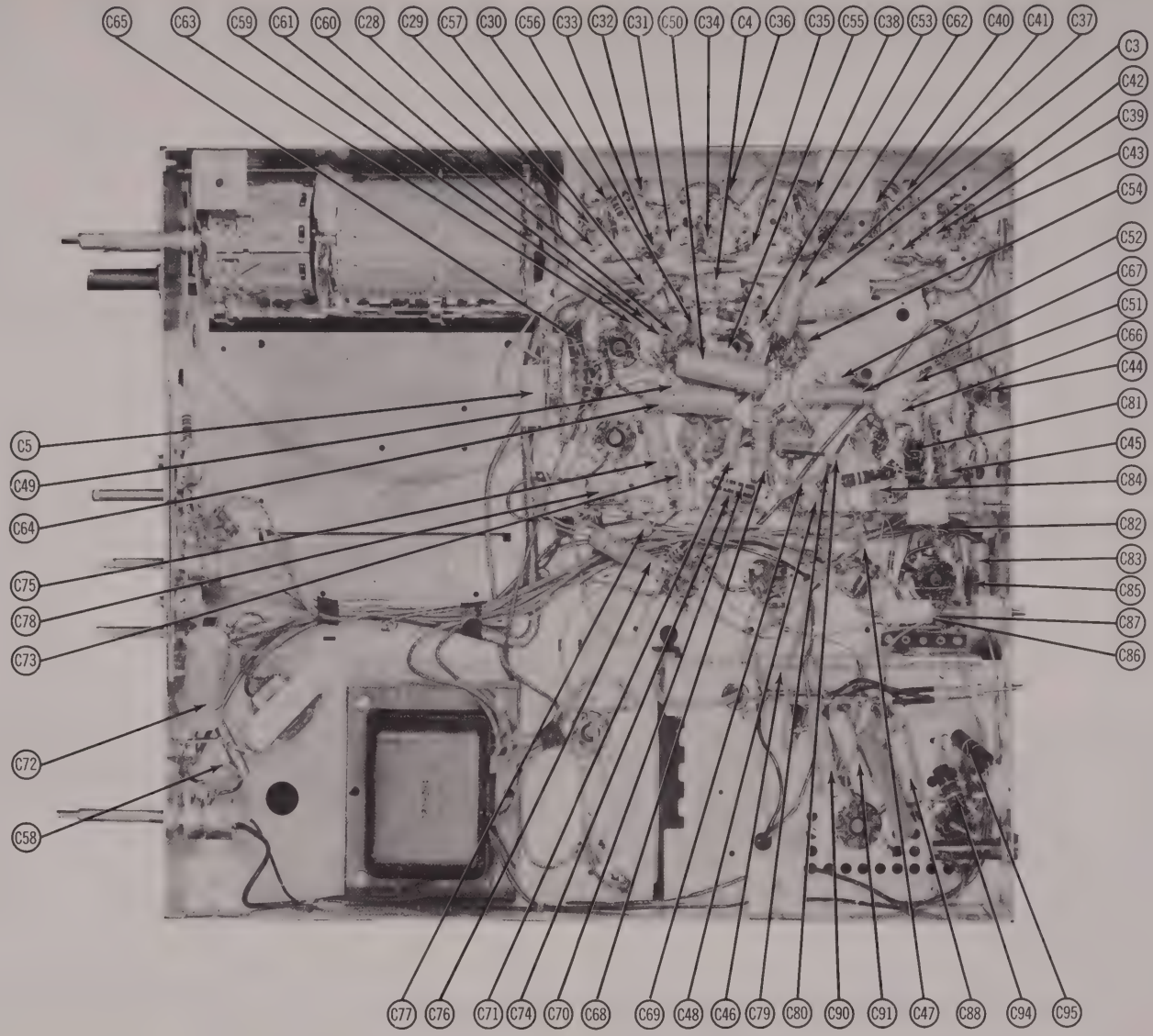
CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

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TUBE PLACEMENT CHART

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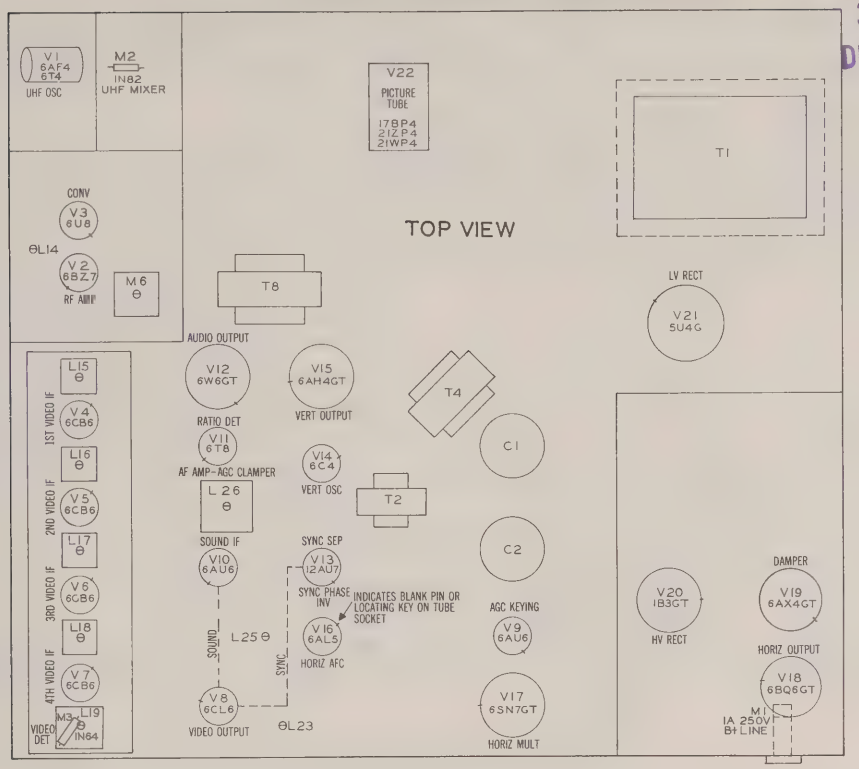

TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V21, Fuse (M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V3, V4, V5, V6, V7, V8, V12 (V1 UHF only)
No pic, no sound, has snow - V2, V3, V4
No pic, has sound, has raster - V8, V22
Has pic, no sound - V10, V11, V12
Overloaded picture - V9, V11

SYNC FAILURE
No vert. sync - V13, V14
No horiz. sync - V13, V16, V17
No vert. or horiz. sync - V13

SWEEP FAILURE
No raster, has sound - V17, V18, V19, V20, V22
No vertical deflection - V14, V15
Poor vert. linearity or foldover - V14, V15
Poor horiz. linearity or foldover - V17, V18, V19
Narrow picture - V17, V18, V19, V20, V21
Vert. off freq. - V13, V14
Horiz. off freq. - V13, V16, V17

SILVERTONE MODELS 3104A, 4108, A, 4112, 4113A, B, 4118B, C, 4119A, 4125, 4127C, D, 4129A, B, 4133, 4135, 4140E, 4150E, 4155E (Ch. 528.271, -1, -2, -3, 528.292, -1, -2, 528.300, -2, 528.303)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal oscillator tube (V17) to disable the high voltage.

VIDEO IF ALIGNMENT

Connect the negative side of a 4.5 volt bias supply to the ungrounded side of C5. Connect the positive lead to chassis. Short antenna leads to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over converter tube (V3). Low side to chassis.	42.9MC (Unmod)	Any non-interfering channel	DC probe to point (A). Common to chassis.	A1, A2	Adjust for maximum deflection. Attenuate generator output to maintain not more than 2.5 volts on VTVM.
2.	"	"	45.2MC	"	"	A3, A4	"
3.	"	"	41.25MC	"	"	A5	Adjust for MINIMUM deflection. Increase generator output to provide useable indication on VTVM.
4.	"	"	47.25MC	"	"	A6	"
5.	"	"	42.9MC	"	"	A1	Adjust for maximum deflection. Attenuate generator output to maintain not more than 2.5 volts on VTVM.
6.	"	"	45.2MC	"	"	A3	"
7.	"	"	44.1MC	"	"	A7, A8	"

OVERALL VIDEO IF RESPONSE CHECK

Attenuate generator output to maintain 2 volts peak to peak on scope.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Direct	High side to ungrounded tube shield floating over converter tube (V3). Low side to tuner chassis.	44MC (10MC Swp)	41.25MC 42.55MC 42.9MC 44.1MC 45.2MC 45.75MC 47.25MC	Any non-interfering channel	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.		Check for response curve similar to Fig.1. If necessary, retouch A1 thru A4 and A7 and A8 to obtain desired response. A4 positions 45.75MC marker and A2 affects tilt.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in series from point (B) to chassis. The junction of these two resistors is alignment point (D) as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	.01MFD	High side to point (A). Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel	DC probe to point (C). Common to chassis.	A9, A10	Adjust for maximum deflection.
10.	"	"	"	"	DC probe to point (C). Common to point (D).	All	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	.01MFD	High side to point (A). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any non-interfering channel	Vert. Amp. to point (B). Low side to chassis.	A9, A10	Disconnect stabilizing capacitor C4. Adjust for curve of maximum amplitude and symmetry similar to Fig. 2.
10.	"	"	"	"	"	Vert. Amp. to point (C). Low side to chassis.	All	Reconnect stabilizing capacitor C4. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 3. SLIGHTLY retouch A10 for maximum amplitude and straightness of crossover lines.

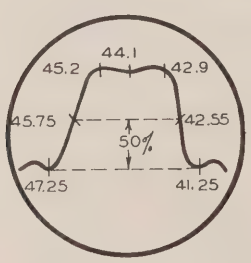

FIG.1

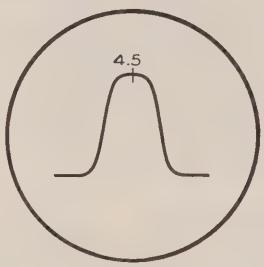

FIG.2

ALIGNMENT INSTRUCTIONS (cont)

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4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
11.	.01MFD	High side to pin 11 (cathode) of picture tube. Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel	DC probe to point (B). Common to chassis.	A12	Adjust for MINIMUM deflection .

ALTERNATE 4.5MC TRAP ALIGNMENT

Turn the set on and tune in a TV station. Adjust A12 for MINIMUM 4.5MC beat interference in picture.

OSCILLATOR ALIGNMENT

Complete oscillator alignment may not be necessary. If the oscillator seems to be off frequency approximately the same amount for a majority of the channels it may be possible to correct them in one step using A13. It should be noted that this is an all channel oscillator circuit adjustment and should not be used to correct any individual channel.
If adjustment of A13 will not bring all channels well within the range of the fine tuning control it will be necessary to adjust the channel strip adjustment for each channel that is off frequency. The channel oscillator adjustment screws are reached thru a hole above and slightly to the left of the channel switch shaft (hole extends thru UHF tuner). The correct ad justment screw is accessible thru this hole as the channel switch is turned to each channel.
Replace the converter tube shield to its normal position.
Connect the bias battery as under "Video IF Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	Two 120Ω Carbon Resistors	Across VHF antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A14	Adjust to place sound marker in trap notch as in Fig. 4. Video marker should be at 50%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A15	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A16	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A17	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A18	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A19	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A20	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A21	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A22	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A23	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A24	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A25	

ON THE AIR UHF OSCILLATOR ADJUSTMENT

Turn the set on and tune in any UHF station available in that area. Adjust the UHF oscillator adjustment screw (accessible th ru hole above and slightly to left of channel switch shaft) for clearest picture and best sound. Repeat procedure for any other available stations.

VHF AND UHF RF AND MIXER ALIGNMENTS

The VHF and UHF RF and Mixer portions of this receiver has been properly aligned at the factory and are very stable. Alignment of these positions should not be required in the field.

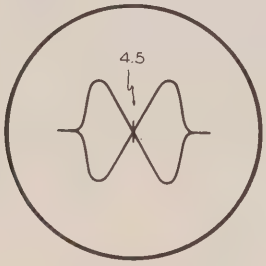


FIG.3

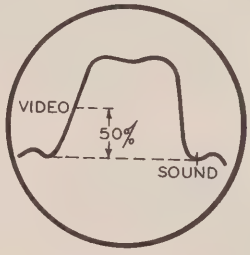


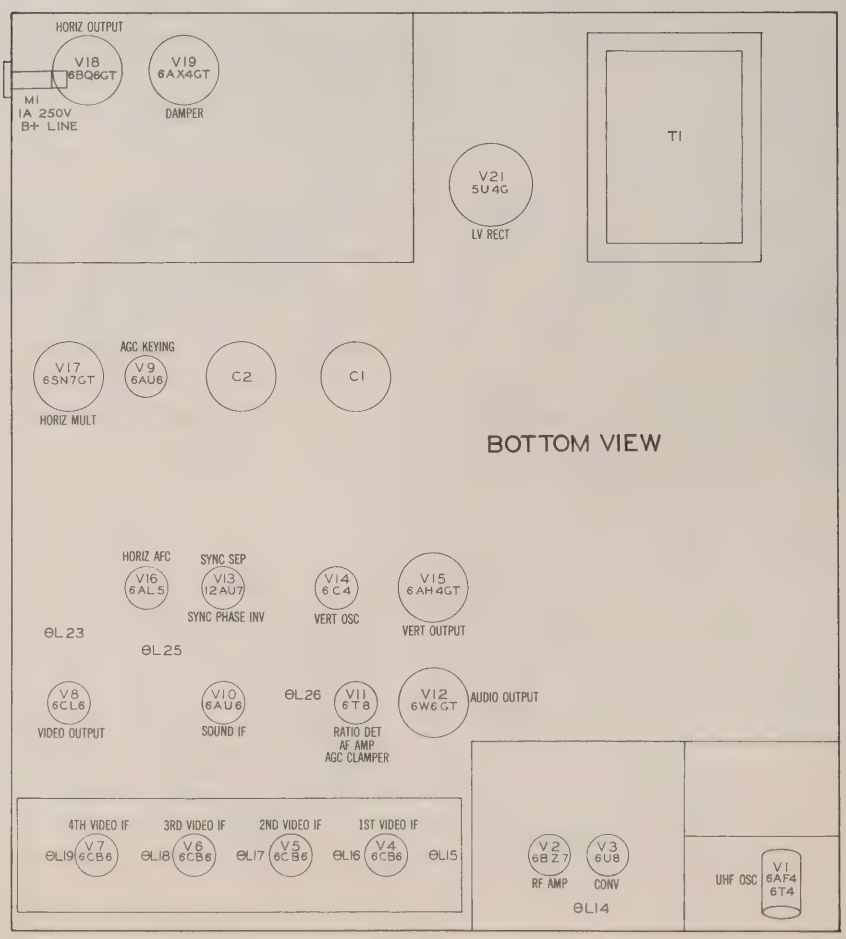
FIG.4

SILVERTONE MODELS 3104A, 4108, A, 4112, 4113A, B, 4118B, C, 4119A, 4125, 4127C, D, 4129A, B, 4133, 4135, 4140E, 4150E, 4155E (Ch. 528.271, -1, -2, -3, 528.292, -1, -2, 528.300, -2, 528.303)

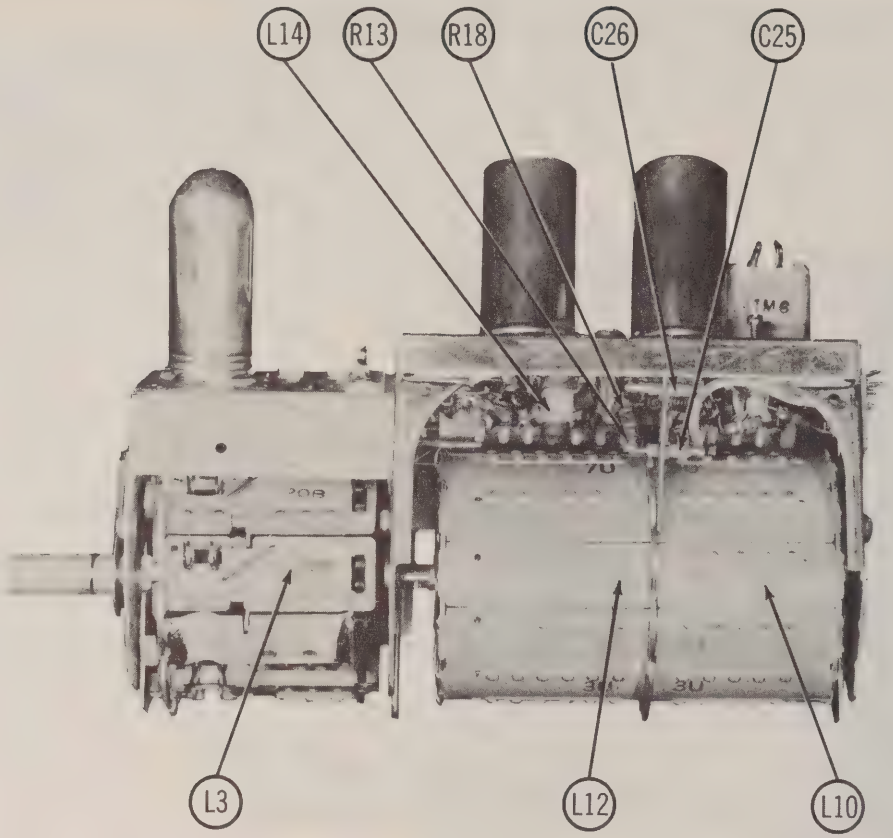
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AF4	■▲5.3KΩ	10KΩ	.2Ω	0Ω	0Ω	10KΩ	■▲4.3KΩ		
V 2	6BZ7	†1.8KΩ	130KΩ	INF	0Ω	.1Ω	INF	770KΩ	0Ω	0Ω
V 3	6U8	▲4.3KΩ	200KΩ	†110KΩ	.1Ω	0Ω	†8.3KΩ	INF	0Ω	10KΩ
V 4	6CB6	33KΩ	47Ω	0Ω	.1Ω	▲100Ω	▲100Ω	0Ω		
V 5	6CB6	34KΩ	47Ω	0Ω	.1Ω	▲100Ω	▲100Ω	0Ω		
V 6	6CB6	.1Ω	150Ω	0Ω	.1Ω	▲100Ω	▲100Ω	0Ω		
V 7	6CB6	.1Ω	150Ω	0Ω	.1Ω	▲100Ω	▲100Ω	0Ω		
V 8	6CL6	10Ω	4.7KΩ	▲10KΩ	0Ω	.1Ω	▲4.9KΩ	0Ω	▲10KΩ	4.7KΩ
V 9	6AU6	▲12KΩ	▲0Ω	▲0Ω	▲.1Ω	300KΩ	85Ω	▲0Ω		
V 10	6AU6	3.2Ω	0Ω	.1Ω	0Ω	†10.1KΩ	▲0Ω	560Ω		
V 11	6T8	INF	12KΩ	INF	0Ω	.1Ω	550KΩ	0Ω	4.7Meg	▲270KΩ
V 12	6W6GT	INF	▲.1Ω	†540Ω	†3.4KΩ	400KΩ	250KΩ	▲0Ω	50KΩ	
V 13	12AU7	▲7.2KΩ	22KΩ	2.2KΩ	0Ω	0Ω	▲680KΩ	1.5Meg	0Ω	.1Ω
V 14	6C4	▲7Meg	INF	.1Ω	0Ω	▲7Meg	2.3Meg	200Ω		
V 15	6AH4GT	2.2Meg	0Ω	INF	INF	†1.1KΩ	INF	.1Ω	1KΩ	
V 16	6AL5	4.8Meg	4.8Meg	0Ω	.1Ω	15KΩ	0Ω	15KΩ		
V 17	6SN7GT	5.2Meg	†9.3KΩ	1.5KΩ	140KΩ	†83KΩ	1.5KΩ	.1Ω	0Ω	
V 18	6BQ6GT	INF	.1Ω	470KΩ	†15KΩ	470KΩ	†15KΩ	0Ω	100Ω	TOP CAP ▲17Ω
V 19	6AX4GT	INF	INF	INF	INF	†105Ω	†85Ω	.1Ω	0Ω	
V 20	1B3GT		PINS	1 - 8	HAVE	INF	RESISTANCE			TOP CAP ▲378Ω
V 21	5U4G	INF	50KΩ	INF	38Ω	INF	38Ω	INF	50KΩ	
V 22	21ZP4	0Ω	47KΩ	PIN 10 ▲100KΩ	PIN 11 ▲220KΩ	PIN 12 .1Ω				

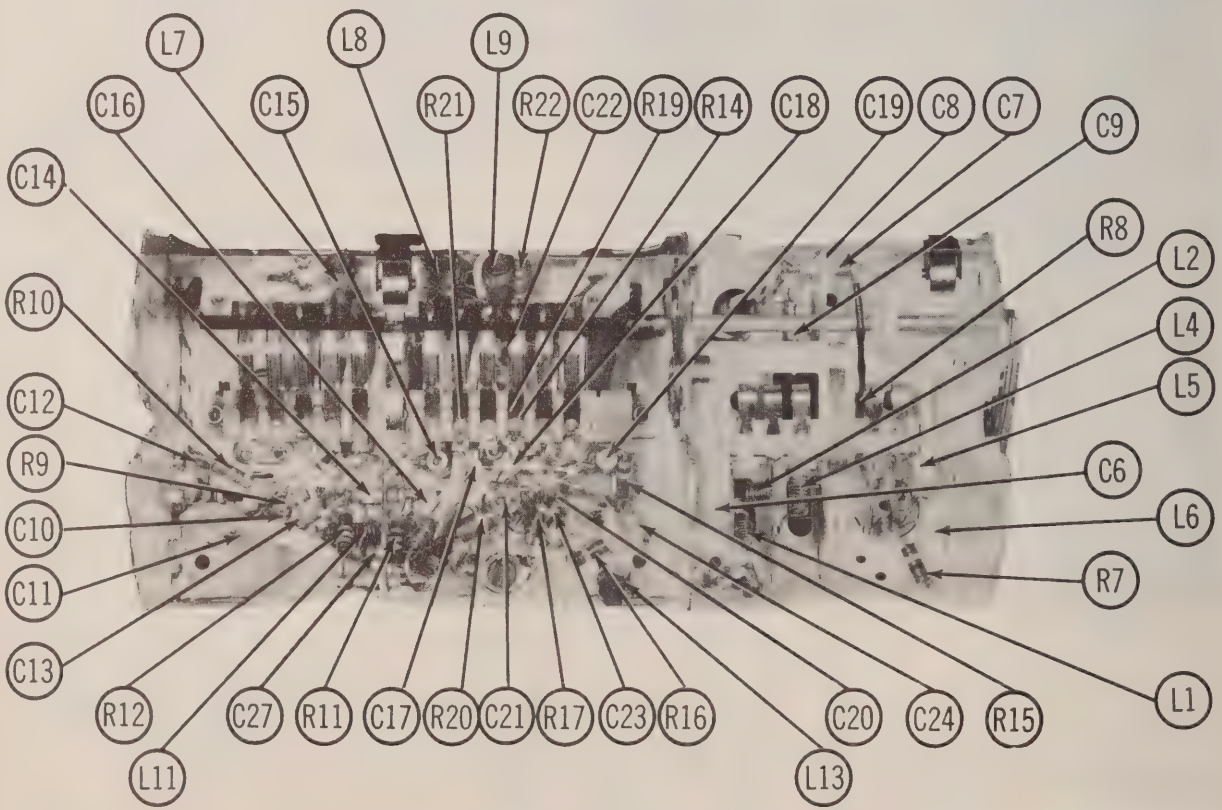
■ MEASURED IN UHF POSITION
▲ MEASURED FROM 125 VOLT LINE
† MEASURED FROM PIN 8 OF V21
▲ MEASURED FROM PIN 3 OF V19



TUBE PLACEMENT CHART



UHF-VHF TUNER-RIGHT SIDE



UHF-VHF TUNER-BOTTOM VIEW

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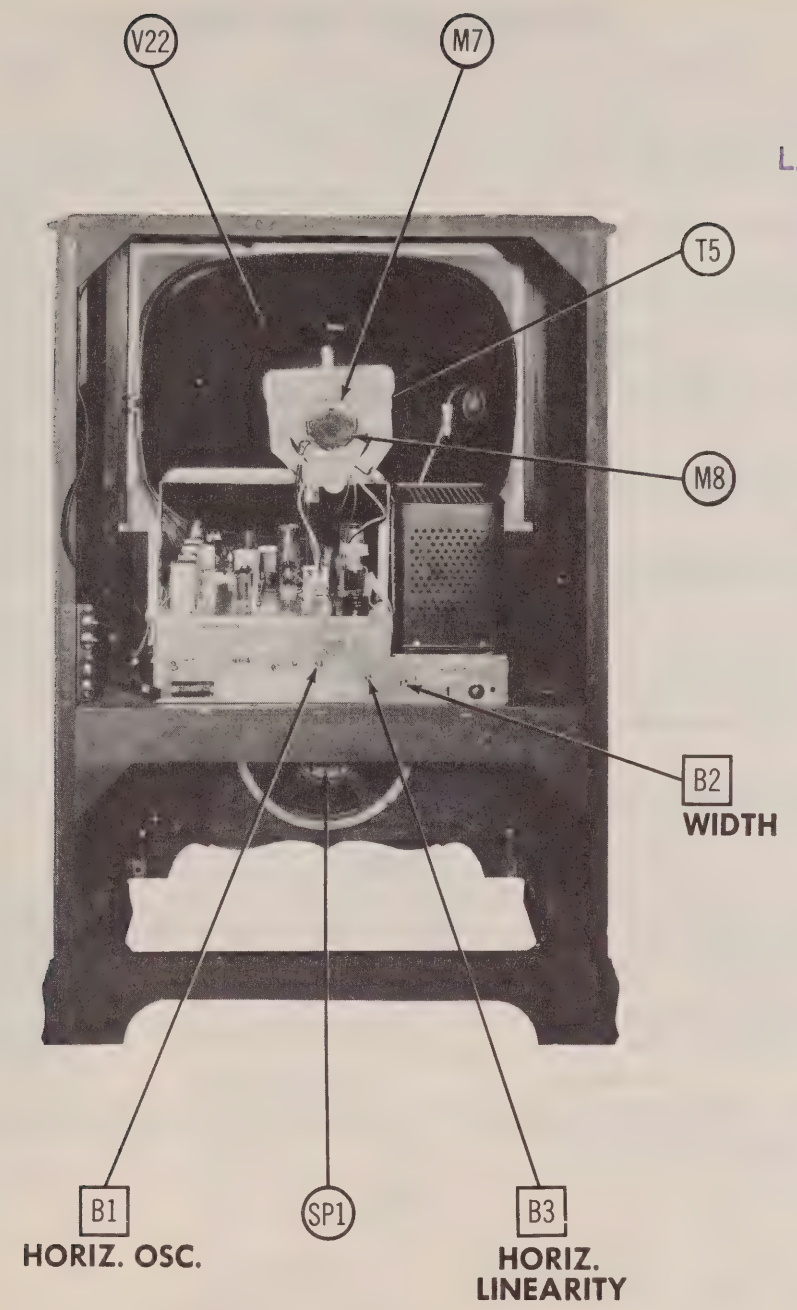

CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Set the horizontal hold control to its mid-range position and adjust the horizontal oscillator slug (B1) until the picture synchronizes horizontally .

Momentarily remove signal by switching off channel and back again. If picture does not fall in sync, SLIGHTLY retouch B1. Repeat procedure until picture falls in sync after momentary removal of signal.

Adjust the width coil slug (B2) for a picture slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity slug (B3) until picture is symmetrical from left to right.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V17, V18, V19 and V21. Check adjustments B1, B2 and B3. Check waveform W15.

If Satisfactory	If Unsatisfactory
Check C90, C91, R100, R101, R98, T3, T5A and other associated circuit components.	Check C89, C92, C87, T7 and other associated circuit components.

DRIVE LINES

Check by substitution V18 and V19. Check C86, C90, C91, R94, R97, T5A and T3 and other associated circuit components.

COMPRESSED LEFT SIDE

Check by substitution V17, V18 and V19. Check components associated with the horizontal output and damper stages especially T3 and T5A for failure or change of value.

FOLDS

Follow procedure outlined under "Drvie Lines".

PIE CRUST EFFECT

Check by substitution V17 and V18. Check associated circuit components.

XMAS TREE EFFECT

Check by substitution V17 and V18. Check C84, C82, C85, R89, R91, R92, L27 and other associated circuit components for failure or change of value.

VERTICAL

LOSS OF SWEEP

Check by substitution V14 and V15. Check waveform W9.

If Satisfactory	If Unsatisfactory
Check T4, T5B, C76, R81 and other associated components.	Check T2, C75, C70, R77, R3A and other associated components.

INSUFFICIENT SWEEP

Check adjustment of height and vertical linearity controls. Proceed as outlined under "Loss of Sweep".

COMPRESSED AT TOP

Check by substitution V15. Check C2D, R80, R6A and other associated components.

COMPRESSED AT BOTTOM

Check by substitution V14 and V15. Check C75, R77, R3A and other associated circuit components.

FOLDS

Check by substitution V14 and V15. Check components associated with V15 for failure or change of value.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V13. Check C67, C68, and other associated components from sync take off.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Check by substitution V13 and V14. Check waveform W8.

If Satisfactory	If Unsatisfactory
Check components associated with T2.	Check by substitution V13. Check C70, CR unit and other associated components.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Check by substitution V16 and V17. Check waveform W12.

If Satisfactory	If Unsatisfactory
Check components associated with V17.	Check V16, C79, C80 and other associated components.

HORIZONTAL BENDING

Check by substitution V13, V16 and V17. Check horizontal AFC filter network (C82, C83, R88 and R89) for failure or change of value.

VIDEO

LOSS OF VIDEO

Check C45, C44, picture tube and other associated components.

SOUND BARS (4.5MC BEAT)

Check fine tuning adjustments. Check adjustment A12. Check video alignment.

POOR CONTRAST

Substitute V8. Check video detector crystal and assembly. Check picture tube and other circuit components.

NEGATIVE PICTURE

Check picture tube. Check video detector assembly. Check A. G. C. network for proper operation.

SMEAR

Check by substitution V8. Check video detector crystal and assembly. Check R40, R41, L21, L24 and other associated circuit components.

WIDE BLACK BAR ACROSS PIX

Check V4, V5, V6, V7 and V8 for heater to cathode leakage. Check V1, V2, V3 in tuner.

AUDIO

WEAK OR NO SOUND

Check by substitution V10, V11 and V12. Check components associated with these stages especially C61, C59, R53, R58, T8 and speaker.

BUZZ

Adjust A11 for minimum buzz. Check adjustment of A11. Substitute V11. Check C4, R56, R54 and other associated components.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

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DENVER, COLORADO

ITEM No.	USE	REPLACEMENT DATA: Silvertone PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1A	UHF Oscillator	6AF4	6AF4	7DK	
B	UHF Oscillator	6T4	6T4	7DK	
V2	RF Amplifier	6BZ7	6BZ7	9AJ	
V3	Converter	6U8	6U8	9AE	
V4	1st. Video IF Amp.	6CB6	6CB6	7CM	
V5	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V6	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V7	4th. Video IF Amp.	6CB6	6CB6	7CM	
V8	Video Output	6CL6	6CL6		
V9	AGC Keying	6AU6	6AU6	7BK	
V10	Sound IF Amp.	6AU6	6AU6	7BK	
V11	Ratio Detector-AF Amplifier-AGC Clamper	6T8	6T8	9E	
V12	Audio Output	6W6GT	6W6GT	7S	
V13	Sync Separator-Sync Phase Inverter	12AU7	12AU7	9A	
V14	Vert. Oscillator	6C4	6C4	6BG	
V15	Vert. Output	6AH4GT	6AH4GT	8EL	
V16	Horiz. AFC	6AL5	6AL5	6BT	
V17	Horiz. Mult.	6SN7GT	6SN7GT	8BD	
V18	Horiz. Output	6BQ6GT	6BQ6GT	6AM	
V19	Damper	6AX4GT	6AX4GT	4CG	
V20	HV Rectifier	1B3GT	1B3GT	3C	
V21	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: SILVERTONE PART No.	CBS-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V22A	21ZP4	21ZP4	21ZP4	21ZP4	21ZP4	12D	① Circuit changes necessary
			21ZP4B ①	21ZP4B ①	21ZP4B ①	12D	
				21ZP4A ①		12D	
B	17BP4		17BP4	17BP4	17BP4	12D	
C	21WP4	21WP4		21WP4			

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: SILVERTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	350	T18-310	AFH3-44		C034		FP377	TVL-3787	
B	▲40	350		PRS350/10		BR4035		TC62	TVA-1604	
C	10	350								
D	■40	350								
C2A	▲40	350	T18-311	AFH4-58		C104		FP423.4	TVL-3762	
B	■10	350		PRS50/100		BBRD7V225			TVA-1423	
C	▲100	200								
D	100	50								
C3	60	200	T18-309	PRS200/30-30		BR6025		TC68	TVA-1613	
C4	4	50	T18-392	PRS150/4		BR550		TC30	TVA-1303	
C5	4	50	T18-392	PRS150/4		BR550		TC30	TVA-1303	
C6A	1.8									
B	.9									
C7	1000			EF-001	MFT-1000				503C-D1	
C8	1000			EF-001	MFT-1000				503C-D1	
C9	10									
C10	.5-3				829-3		3115-01-0R5	CT565A		
C11	6.8			SI6.8NP0	TCZ-6.8	Z013	NP0K-6R8	ZT-5568	5TCCB-V68	
C12	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C13	3			SI3NP0	TCZ-3	Z007	NP0K-030	ZT-5533	5TCCB-V33	
C14	1000			EF-001	MFT-1000				503C-D1	
C15	.5-3				829-3		3115-01-0R5	CT565A		
C16	1.5			SI1.5NP0	TCZ-1.5	Z004	NP0K-1R5	ZT-5515	5TCCB-V15	
C17	47			BPD-000047	D6-470	G033	801-470	UC-5447	5GA-Q47	
C18	47									
C19	.5-3				829-3		3115-01-0R5	CT565		
C20	5									
C21	10			SI10NP0	TCZ-10	Z018	NP0K-100	ZT-541	5TCC-Q1	
C22	.5-3				829-3		3115-01-0R5	CT565A		
C23	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C24	220			BPD-00022	D6-221	G051	811-221	UC-5322	5GA-T22	
C25	1000			EF-001	MFT-1000				503C-D1	
C26	1000			EF-001	MFT-1000				503C-D1	
C27	1000			EF-001	MFT-1000				503C-D1	
C28	56			SI56NP0	TCZ-56	Z036	NP0L-560	ZT-5456	5TCC-Q56	Note 1
C29	120			BPD-00012	D6-121	G044		UC-5312	5GA-T12	
C30	1000		T15-247	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C31	1000		T15-247	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C32	1000		T15-247	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C33	1500		T16-241	BPD-0015	DD-152	K077	801-0015	DC-5215	5HK-D15	
C34	1000		T15-247	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C35	1000		T15-247	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C36	1000		T15-247	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C37	1000		T15-247	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C38	1000		T15-247	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C39	1000		T15-247	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C40	1000		T15-247	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C41	1000		T15-247	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C42	1500		T16-241	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C43	3		T15-249	SI3.3NP0	TCZ-3	Z008	NP0K-030	ZT-5533	5TCCB-V33	
C44	47			SI47NP0	TCZ-47	TZ22	NP0K-470	ZT-5447	5TCC-Q47	
C45	.1	400	T16-244	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C46	.047	1000	T16-235	P1088-047		CUB16S47		PT16147	MB-S47	
C47	1000		T15-220	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	

SILVERTONE MODELS 3104A, 4108, A, 4112, 4113A, B, 4118B, C, 4119A, 4125, 4127C, D, 4129A, B, 4133, 4135, 4140E, 4150E, 4155E (Ch. 528.271, -1, -2, -3, 528.292, -1, -2, 528.300, -2, 528.303)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA SILVERTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C48	5000		T16-177	BPD-005	DD-502	K060	811-005	DC-525	5HK-D5	
C49	5000		T16-177	BPD-005	DD-502	K060	811-005	DC-525	5HK-D5	Note 2
C50	.47	308	T16-240	P288-47		CUB2P47		PT4047	47M-P47	
C51	3.3			SD3.3M20	TCZ-3.2	Z008			5TCC8-V32	
C52	30			SD30	D6-300	Q033	GP1K-300	UC-543	5GA-Q2	
C53	5000		T16-177	BPD-005	DD-502	K060	811-005	DC-525	5HK-D5	
C54	5000		T16-177	BPD-005	DD-502	K060	811-005	DC -525	5HK-D5	
C55	5000		T16-177	BPD-005	DD-502	K060	811-005	DC-525	5HK-D5	
C56	220	500	T16-218	1466-00025	D6-221	5W5T22	GP2K-221	MC340	1FM-S25	
C57	3000		T16-238	BPD-002	DD-302	K072	801-002	DC-523	5HK-D2	
C58	10000		T16-211	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	Note 3
C59	5000		T16-177	BPD-005	DD-502	K060	811-005	DC-525	5HK-D5	
C60	5000		T16-177	BPD-005	DD-502	K060	811-005	DC-525	5HK-D5	Note 4
C61	.01	400	T16-247	P488-01	D6-103	CUB4S1	GP3-333-103	PT401	47M-S1	
C62	.1	400	T16-244	P488-1	DF-104	CUB4P1		PT401	47M-P1	
C63	1000	500	T16-220	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C64	.47	200	T16-240	P288-47		CUB2P47		PT4047	47M-P47	
C65	.01	600	T16-237	P688-01	D6-103	CUB6S1	GP2- 333-103	PT611	67M-S1	
C66	150		T15-261	BPD-00015	D6-151		811-151	UC-5315	5GA-T15	
C67	.047	400	T16-245	P488-047	DF-503	CUB4S47		PT4147	47M-S47	
C68	.047	400	T16-245	P488-047	DF-503	CUB4S47		PT4147	47M-S47	Note 5
C68A	.002							PT623		
B	.005		♦T17-109	♦PA-110	♦PC-100	♦115M1	♦1405-01	PT625	♦401C1	
C	.005							PT625		
C70	.0047	600	T16-233	1464-005		IDRSD47		MCB465	M3-25	
C71	.0047	600	T16-230	P688-0047	D6-472	CUB6D47	GP2-333-472	PT6247	67M-D47	
C72	.47	600	T16-249	684-47		CUB6P47		PT605	67M-P47	
C73	.01	400	T16-247	P488-01	D6-103	CUB6S1	GP2-333-103	PT611	67M-S1	
C74	.022	400	T16-248	P488-022	DF-303	CUB4S22		PT4123	47M-S22	
C75	.1	400	T16-244	P488-1	DF-104	CUB4P1		PT401	47M-P1	
C76	.047	400	T16-245	P488-047	DF-503	CUB4S47		PT4147	47M-S47	
C77	.01	400	T16-247	P488-01	D6-103	CUB4S1	GP2-333-103	PT401	47M-S1	
C78	.0047	600	T16-220	P688-0047	D6-472	CUB6D47	GP2-333-472	PT6247	67M-D47	
C79	1000		T15-220	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C80	1000		T15-220	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C81	.01	600	T16-237	P688-01	D6-103	CUB6S1	GP2-333-103	PT611	67M-S1	
C82	.0047	600	T16-230	P688-0047	D6-472	CUB6D47	GP2-333-472	PT6247	67M-D47	
C83	.047	400	T16-245	P488-047	DF-503	CUB4S47		PT4147	47M-S47	
C84	3900	500		1464-004		IDRSD39		MCB463	M3-24	Note 6
C85	330	500	T15-226	1469-00035		5R5T33				
C86	330	500	T15-226	1469-00035		5R5T33				
C87	.01	400	T16-247	P488-01	D6-103	CUB4S1	GP2-333-103	PT611	67M-S1	
C88	.1	400	T16-244	P488-1	DF-104	CUB4P1		PT401	47M-P1	
C89	.22	300	T16-253	P288-22		CUB2P22		PT4025	27M-P22	Note 2
C90	.047	400	T16-245	P488-047		CUB6S47		PT6147	67M-S47	
C91	.047	400	T16-245	P488-047		CUB6S47		PT6147	67M-S47	
C92	500	20000	T15-239	HV30C	TV3-500	MMU30T5	413	HV20035A	20DK-T5	
C93	56	2000							20GA-Q56	
C94	.01	600	T16-237	689ZX-01	D6-103	CUB6S1	GP2-333-103	PT611	67M-S1	
C95	.01	600	T16-237	689ZX-01	D6-103	CUB6S1	GP2-333-103	PT611	67M-S1	

Note 1. C38 is incorporated within the tuner in some models.
Note 2. Not used in all Models.
Note 3. Chassis 528.271, 528.271-1, 528.292 and 528.292-1 use 5000MMF in this application.
Note 4. Used only in chassis 528.300.
Note 5. Not used in chassis 528.271-1, 528.292, 528.292-1 and 528.303.
Note 6. Some models use 270MMF in this application (part #T15-258)
♦ Items C89A, C89B, C89C, R75A, R75B, R75C are combined in one unit.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA SILVERTONE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1000Ω	½	24-208	* QJ-548	RTV-282		UFBL)	Contrast - Panel Note 1
B	500KΩ	½					UR55A) ††	Volume-Rear
C	Switch						US-26)	Attach to R1B
R2	500KΩ	½	T25-207					Tone & Switch
R3A	4.7 Meg with 1Meg Stop	½	A25-35	Q11-141	A47-5 Meg-S	AB-58	U-67	Height Note 2
B	Shaft		Not Req.	RQ	FK3-1/4	AK-1	Not Req.	Attach to R3A
R4A	50KΩ	½	A25-29	■QJ-525	RTV-458		UF54L) ††	Vert. Hold - Panel
B	2 Meg	½					UR26L)	Horiz. Hold - Rear
R5A	100KΩ	½	A25-26	Q11-128	A47-100K-S	AB-40	U-61	Brightness
B	Shaft		Not Req.	Not Req.	KS8-3	AK-4	Not Req.	Attach to R5A
R6A	2500Ω	½	A25-13	Q11-112	A47-3000-S	AB-7	U-8	Vert. Linearity
B	Shaft		Not Req.	RQ	FK3-1/4	AK-1	Not Req.	Attach to R6A

* CONCENTRIKIT EQUIVALENT KIT K-2 BASE ELEMENTS & SHAFTS B11-108 & P1-210 (Panel)
B13-133 & R1-238 (Rear) & SWITCH 76-1.
■ CONCENTRIKIT EQUIVALENT KIT K-2 BASE ELEMENTS & SHAFTS BU-123 & P9-124 (Panel)
BU-139 & RU-200 (Rear)

Note 1. Some models may use an alternate 300Ω contrast control (Part No. T24-214)
Note 2. Connecta .1Meg resistor in series with the right hand terminal of the control and the lead
connecting to the same terminal of the original control (control viewed from shaft end, terminals down)
† Universal replacement (Mallory exact duplicated Part No. UR52S)
†† Universal replacement (Mallory exact duplicate Part No. UE-1037)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA SILVERTONE PART No.	IRC PART No.	NOTES
R7	10KΩ	½		BTS-10K	
R8	1000Ω	½		BTS-1000	
R9	22KΩ	½		BTS-22K	
R10	47KΩ	½		BTS-47K	
R11	270KΩ	½		BTS-270K	
R12	180KΩ	½		BTS-180K	
R13	68Ω	½		BTS-680	
R14	15KΩ	½		BTS-15K	
R15	100KΩ	½		BTS-100K	
R16	100KΩ	½		BTS-100K	
R17	100KΩ	½		BTS-100K	
R18	8200Ω	½		BTS-8200	
R19	10KΩ	½		BTS-10K	
R20	3300Ω	½		BTA-3300	
R21	33KΩ	½		BTS-33K	
R22	4700Ω	½		BTS-4700	
R23	1000Ω	½	T60-703	BTS-1000	
R24	1000Ω	½	T60-703	BTS-1000	
R25	5800Ω	½	T60-910	BTS-5800	
R26	100Ω	½	T60-752	BTS-100	
R27	47Ω	½	T60-798	BTS-47	
R28	100Ω	½	T60-752	BTS-100	
R29	4700Ω	½	T60-759	BTS-4700	
R30	1000Ω	½	T60-703	BTS-1000	

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA SILVERTONE PART No.	IRC PART No.	NOTES
R31	47Ω	½	T60-798	BTS-47	
R32	100Ω	½	T60-752	BTS-100	
R33	2700Ω	½	T60-771	BTS-2700	
R34	150Ω	½	T60-767	BTS-150	
R35	1000Ω	½	T60-753	BTS-1000	
R36	10KΩ	½	T60-760	BTS-10K	
R37	150Ω	½	T60-767	BTS-150	
R38	1000Ω	½	T60-753	BTS-1000	
R39	4700Ω	½	T60-759	BTS-4700	
R40	390Ω	½	T60-665	BTS-390	Note 2
R41	100Ω	½	T60-760	BTS-10K	
R42	2700Ω	2	T60-814		
R43	2200Ω	2	T60-905		
R44	150KΩ	½	T60-918	BTS-150K	
R45	47KΩ	½	T60-903	BTS-47K	
R46	180KΩ 5%	½	T60-788	BTS-180K 5%	
R47	10KΩ	½	T60-760	BTS-10K	
R48	47KΩ	½	T60-903	BTS-47K	
R49	470KΩ	½	T60-902	BTS-470K	
R50	220KΩ	½	T60-672	BTS-220K	
R51	33KΩ	½	T60-748	BTS-33K	
R52	560Ω	½	T60-758	BTS-560	
R53	10KΩ	1	T60-698	BTA-10K	
R54	220Ω	1	T60-753	BTS-220	
R55	47KΩ	1	T60-903	BTS-47K	
R56	12KΩ	1	T60-811	BTS-12K	
R57	4.7Meg	1	T60-904	BTS-4.7Meg	
R58	270KΩ	1	T60-747	BTS-270K	
R59	1.8Meg 5%	1		BTS-1.8Meg 5%	Note 1
R60	100KΩ	1	T60-801	BTS-100K	
R61	100Ω	1	T60-752	BTS-100	
R62	470KΩ	1	T60-902	BTS-470K	
R63	470KΩ	1	T60-902	BTS-470K	
R64	3300Ω	1	T60-724	BTA-3300	
R65	15KΩ	2	T60-901	BTB-15K	
R66	220Ω	2	T60-928	BTB-220	
R67	15KΩ	½	T60-783	BTS-15K	
R68	270KΩ	½	T60-747	BTS-270K	
R69	1.5 Meg	1	T60-880	BTS-1.5Meg	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA SILVERTONE PART No.	IRC PART No.	NOTES
R70	680KΩ	½	T60-807	BTS-680K	
R71	22KΩ	½	T60-744	BTS-22K	Note 2
R72	390KΩ	½	T60-922	BTS-390K	Note 2
R73	3900Ω	½	T60-710	BTS-3900	
R74	3300Ω	½	T60-882	BTS-3300	
R75A	22KΩ	)		BTS-22K	
B	8200Ω	) ♦	T17-109	BTS-8200	
C	8200Ω	)		BTS-8200	
R76	1.5 Meg	1		BTA-1.5Meg	Note 3
R77	3.3Meg	1	T60-922	BTS-3.3Meg	
R78	10KΩ 5%	½		BTS-10K 5%	
R79	2.2Meg	1	T60-898	BTS-2.2Meg	
R80	470Ω	1	T60-694	BTA-470	
R81	470Ω	1	T60-694	BTA-470	
R82	560Ω			BTS-560	
R83	560Ω			BTS-560	
R84	33KΩ	½	T60-748	BTS-33K	
R85	15KΩ	2	T60-901	BTB-15K	
R86	100KΩ	½	T60-801	BTS-100K	
R87	100KΩ	½	T60-801	BTS-100K	
R88	4.7 Meg	1	T60-904	BTS-4.7Meg	
R89	470KΩ	½	T60-902	BTS-470K	
R90	150Ω	½	T60-729	BTS-1500	
R91	8200Ω	½	T60-778	BTS-8200	
R92	120KΩ	½	T60-817	BTS-120K	
R93	82KΩ	½	T60-700	BTA-82K	
R94	8200Ω 5%	½	T60-778	BTS-8200 5%	
R95	1000Ω	½	T60-703	BTS-1000	
R96	470KΩ	½	T60-902	BTS-470K	
R97	100Ω	½	T60-752	BTS-100	
R98	100Ω	2	T60-919		
R99	100Ω	3	T60-752	BTS-100K	
R100	15KΩ	10	T60-894	1 3/4A-15K	Note 4
R101	100Ω	2		BTB-1000	
R102	100KΩ	½	T60-801	BTS-100K	
R103	3.3Ω	½	T60-884		
R104	1 Meg	½	T60-877	BTA-1 Meg	
R105	220KΩ	½	T60-672	BTS-220K	
R106	2200Ω	½	T60-714	BTS-2200	
R107	120KΩ	2		BTS-120K	Note 5

♦ Items R75A, R75B, R75C, C69A, C69B, C69C are combined in one unit.
Note 1. Some models may use a 2.2 Meg resistor in this application.
Note 2. Not used in all models.
Note 3. Some models may use a 1.8 Meg resistor in this application.
Note 4. Some models may use a 10KΩ resistor in this application.
Note 5. Used in chassis 528.303 only.

TRANSFORMER (POWER)

ITEM No	RATING PRI	RATING SEC 1	RATING SEC 2	REPLACEMENT DATA SILVERTONE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC ② 1.64A	564VCT .220ADC	5VAC ③ 3A	80-294	P-8333①		R-61BC ②			
	SEC 3	SEC 4	SEC 5							
	6.3VAC ④ 1.43A	6.3VAC ⑤ 8.9A								

① Drill new mounting holes.
② Parallel and phase 6.3V 6A windings Sec. # 4.
③ Parallel and phase 6.3V . 9A and 7.1A windings Sec. # 4.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA SILVERTONE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T2	Vert. Osc. Trans.	T60-288	A-812⑥	A-3003 ①	A-97K①	209T①	B6702 ①	24A87①
T3	Horiz. Output Trans.	T60-283		HVD-9 & MWC-1 ⑦	D-18 & WC-11 ⑦ ②	232T1 & 212R1 *	FB41 & RF800 ⑦②	
T4	Vert. Output Trans.	T60-290	A-8142② ③	A-3031①③	A-108K ①		21B02①③	26S53①③
T5A	Yoke-Horiz.(14MH)	T63-776 ④	DY-9A	MDF-72	Y-17-1	21ID2	DF602	Y-7
B	Yoke-Vert. (43MH)							
T6	Horiz. Lin. Coil(1.5-8.5MH)	T10-582	WC-8	MWC-6 ⑧	WC-12 ⑦	213R1		WC-17
T7	Width Coil (.05-.23MH)	T10-604 ⑤ T10-581 T10-602 ⑤	WC-1			201R1		WC-11

① Drill one new mounting hole.
② Drill new mounting holes.
③ Connect as auto transformer.
④ Includes resistors R82, R83, R101, capacitor C93.
⑤ Used in chassis 528.271 only.
⑥ Enlarge mounting hole.
⑦ Connect to coded blue and green terminals.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Stancor Replacement Connections	Merit Replacement Connections	Triad Replacement Connections	RCA Replacement Connections	Halldorson Replacement Connections	Thordarson Replacement Connections
Horiz. Output Plate Lead		9	9	10	9	
5 (NC)		NC	NC	NC	NC	
4		7	7 & 8	See Note 5	See Note 10	
3		T	T	4	T	
2		3	3	2	T	
1		1	1	3	3	
A		MWC-1(Blue)	WC-11 (Blue)	2	RF800-width control winding	
G		MWC-1 (red)	WC-11 (Red)	1	RF800-width control winding	

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Stancor Replacement Connections	Merit Replacement Connections	Triad Replacement Connections	RCA Replacement Connections	Halldorson Replacement Connections	Thordarson Replacement Connections
Connect Width Coil Across	2 & 1		MWC-1 (orange & black) 3 & 1	WC-11 (orange & black) 3 & 1	21ZR1 2 & 1	R F800 (AGC winding) T & 3
Special Notes →			⑨ ⑪	⑪	⑨	⑧ ⑩ ⑪

⑧ If insufficient width, connect a .004MMF, 600V capacitor across terminals "T" and #3.
⑨ Connect yellow lead (damper cathode) to terminal #9. Connect red lead (yoke) to terminal #7.
⑩ Connect yellow lead (damper cathode) to terminal #8. Connect red lead (yoke) to terminal #7.
⑪ If the picture is out of phase, reverse primary (or secondary) of width coil.

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE PRI	IMPEDANCE SEC.	REPLACEMENT DATA SILVERTONE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T8	2.1KΩ	3.2Ω	80-291	A-3849	A-2928 ①	S-43X ①	Z1010		① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA SILVERTONE PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1A	10"	PM	3.3Ω	79-406 ①	10J11	10A31	① Used in models 4440E, 4150E, 4155E
B	8"	PM	3.3Ω	79-399 ②	8J9	8A21	② Used in models 4129A, B, 4133, 4135
C	6"	PM	3.3Ω	79-398 ③	6J4	6A1	③ Used in models 4125, 4127C, D
D	5"	PM	3.3Ω	79-397 ④	5J4	5A1	④ Used in models 3104A, 4108, A, 4112, 4113A, B, 4118B, C, 4119A

COILS (RF-IF)

ITEM No.	USE	DC RES PRI.	DC RES SEC.	REPLACEMENT DATA SILVERTONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Coil	0Ω						
L2	UHF Ant. Coil	0Ω						
L3	UHF Ant., Mixer & Osc. Coils							
L4	RF Choke	0Ω						
L5A	Fil. Choke	0Ω						
B	Fil. Choke	0Ω						
L6	Cathode Choke	0Ω						
L7	UHF IF Input Coil	0Ω	.4Ω					
L8	UHF IF Interstage Coil	.4Ω	.1Ω					
L9	UHF IF Interstage Coil	.2Ω						
L10	VHF Ant. Coil	0ΩCT	0Ω					
L11	Neutr. Coil	0Ω						
L12	RF, Mixer Grid & Osc. Coils	0Ω						
L13	Fil. Choke	0Ω						
L14	Conv. Plate	.1Ω						
L15	1st Video IF	0Ω		T10-593 # 1				Includes RF choke (2.9Ω)
L16	2nd Video IF	0Ω	0Ω	T10-594 # 2	17-4531 ■		6232	Includes Trap
L17	3rd Video IF	0Ω	0Ω	T10-595 # 3			6233	Includes Trap
L18	4th Video IF	0Ω	0Ω	T10-596 # 4	17-4531 *		6234	
L19	5th Video IF	0Ω	0Ω	T10-597 # 5				Includes ED64 Crystal detector (Part # T48-70) capacitors, & series peaking coil (1.1Ω)
L20	Series Peaking Coil	10Ω		T10-600	39-3160	TV-184	4644	149 Microhenries
L21	Shunt Peaking Coil	11Ω		T10-590	19-3250	TV-185	6181	269 Microhenries
L22	Series Peaking Coil	8.5Ω		T10-591	19-3160 ▲	TV-184 ▲	4644 ▲	150 Microhenries; wound on 10KΩ resistor
L23	4.5MC Trap	3.2Ω		T10-581	30-1004	TV-181	1469	
L24	Shunt Peaking Coil	11Ω		T10-590	19-3250	TV-185	6181	269 Microhenries
L25	Sound IF	3.2Ω		T10-587	30-1005	TV-181	1469	
L26	Ratio Det.	3.7Ω	.3ΩCT	T10-552	17-1033 ■	TV-110 ■	1468 ■	Tertiary windings .85Ω
L27	Horiz. Osc.	55Ω		T10-583	19-1576	TV-163	6210	

* Drill mounting holes and detune trap winding.
▲ Parallel with 10KΩ resistor.
■ Drill mounting holes.
Note 1. Alternate Part # T10-658, not replaceable with Part numbers given , used in Ch. 528.271-4, 528.292-2, 528.303-1.
Note 2. Alternate Part # T10-659, not replaceable with Part numbers given , used in Ch. 528.271-4, 528.292-2, 528.303-1.
Note 3. Alternate Part # T10-660, not replaceable with Part numbers given , used in Ch. 528.271-4, 528.292-2, 528.303-1.
Note 4. Alternate Part # T10-661, not replaceable with Part numbers given , used in Ch. 528.271-4, 528.292-2, 528.303-1.
Note 5. Alternate Part # T10-662, not replaceable with Part numbers given , used in Ch. 528.271-4, 528.292-2, 528.303-1.

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D C RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA SILVERTONE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L28	.220A	85Ω	1.26HY	33-238	C-2327	C-2996 ①	C-21X ①	C5037 ①	T-26C44 ①

① Drill one new mounting holes.

SILVERTONE MODELS 3104A, 4108, A, 4112, 4113A, B, 4118B, C, 4119A, 4125, 4127C, D, 4129A, B, 4133, 4135, 4140E, 4150E, 4155E (Ch. 528.271, -1, -2, -3, 528.292, -1, -2, 528.300, -2, 528.303)

PARTS LIST AND DESCRIPTIONS (Continued)

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			SILVERTONE PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	1A 250V	T43-15	T87-44	213001. (3AG-1A)	341001	AGC1	HKP

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		SILVERTONE PART No.	SYLVANIA PART No.	FEDERAL PART No.	
M2	1N82		1N82 or A		UHF mixer
M3	1N64	T48-70	1N132	1N64A	Video detector

MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
M4	Dial Light	T89-7	#47 bayonet
M5	Tuner	T95-35	UHF/VHF all channel
M6	Trap		41MC (VHF antenna)
M7	Focus Magnet	T10-611	Includes centering device
M8	Ion Trap	T83-684	Single Magnet
	Cabinet	T42-652	3104A leatherette table
	Cabinet	T42-615	4108 marlite table
	Cabinet	T42-644	4108A marlite table
	Cabinet	T42-649	4112 leatherette table
	Cabinet	T42-630	4113A leatherette table
	Cabinet	T42-657	4113B leatherette table
	Cabinet	T42-646	4118B mahogany table
	Cabinet	T42-646	4118C mahogany table
	Cabinet	T42-648	4119A limed oak table
	Cabinet	T42-641	4125 mahogany console
	Cabinet	T42-625	4127C leatherette console
	Cabinet	T42-650	4127D leatherette console
	Cabinet	T42-626	4129A marlite console
	Cabinet	T42-656	4129B marlite console
	Cabinet	T42-643	4133 mahogany console
	Cabinet	T42-642	4135 limed oak console
	Cabinet	T42-580	4140E mahogany console
	Cabinet	T42-581	4150E mahogany console with doors
	Cabinet	T42-583	4155E maple console with doors
	Knob	T52-436	VHF selector
	Knob	T52-437	UHF Selector marlite, mahogany, maple
	Knob	T52-438	Fine tuning and leatherette models
	Knob	T52-435	Contrast
	Knob	T52-434	Volume
	Knob	T52-441	VHF selector
	Knob	T52-440	UHF selector
	Knob	T52-439	Fine tuning limed oak models
	Knob	T52-442	Contrast
	Knob	T52-443	Volume
	Safety Glass	T48-67	Models 4113A, 4118B, C, 4119A, 4127C, 4129A, 4133, 4135
	Safety Glass	T48-73	Models 4108
	Safety Glass	T48-75	Models 4140E, 4150E, 4155E
	Safety Glass	T48-78	Models 3104A, 4108A, 4125
	Safety Glass	T48-79	Models 4112, 4113B, 4127D, 4129B

TROUBLE SHOOTING AIDS (cont)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

POWER

DEAD SET

If filaments fail to light check AC interlock assembly, switch on volume control. If filaments light, check phono switch to see if in TV position. Substitute V21. Check MI 1-Amp. fuse. Check B+ filter and decoupling network components.

SMALL AND/OR DIM PIX

Substitute V21. Check B+ filter and decoupling components.

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V17, V18, V19 and V20. Check waveform W15.

If Satisfactory	If Unsatisfactory
Check C88, C90, C91, R99, R100, R98, T3, T5B and other associated components.	Check C85, C87, R93, R95, R96, R97 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V17, V18, V19 and V20. Check picture tube. Proceed as outlined under "Loss of High Voltage".

BLOOMING

Check by substitution V18, V19, V20 and V21. Check T3, T5A, C89, R100, R98, picture tube and other associated circuit components.

GENERAL

RASTER SOUND NO PIX

Follow procedure outlined under Loss of Video.

RASTER NO SOUND NO PIX VHF

Check UHF, VHF switch position. Check by substitution V4, V5, V6, V7 and V8. Check associated components.

RASTER NO SOUND NO PIX UHF

Check UHF, VHF switch position. Check V1, V2 and V3.

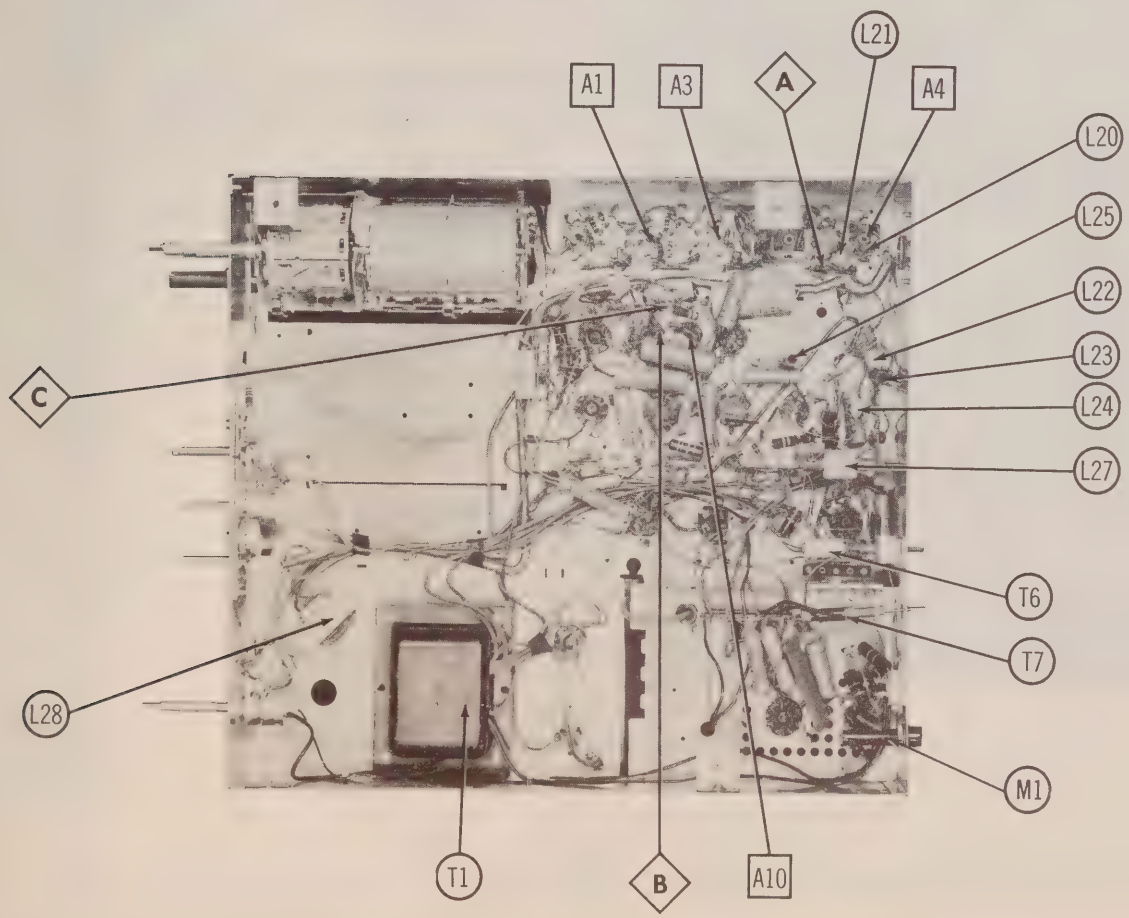
NO RASTER NO SOUND

Follow procedure outlined under "Dead Set".

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing. Check C92, R104 for internal break down.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR & ALIGN. IDENTIFICATION

SILVERTONE MODELS 3104A, 4108, A, 4112, 4113A, B, 4118B, C, 4119A, 4125, 4127C, D, 4129A, B, 4133, 4135, 4140E, 4150E, 4155E (Ch. 528.271, -1, -2, -3, 528.292, -1, -2, 528.300, -2, 528.303)

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at time, thru the small hole in the cabinet above and slightly to the left of the channel selector shaft.

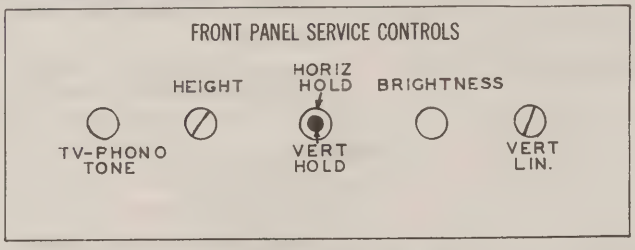
PICTURE TUBE SAFETY GLASS CLEANING

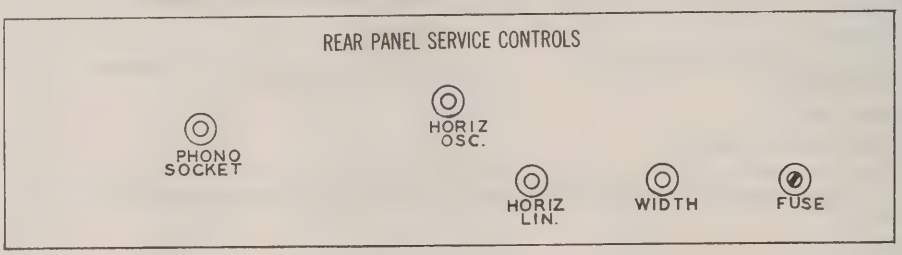
To clean safety glass remove 5 wood screws holding metal strip at the top front of the cabinet. Remove metal strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION





HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the rear panel of the chassis. Set the horizontal hold control at the mid-position of its range and adjust the horizontal oscillator slug (L27) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L26) located on top of chassis. (See tube placement chart).

FUSES

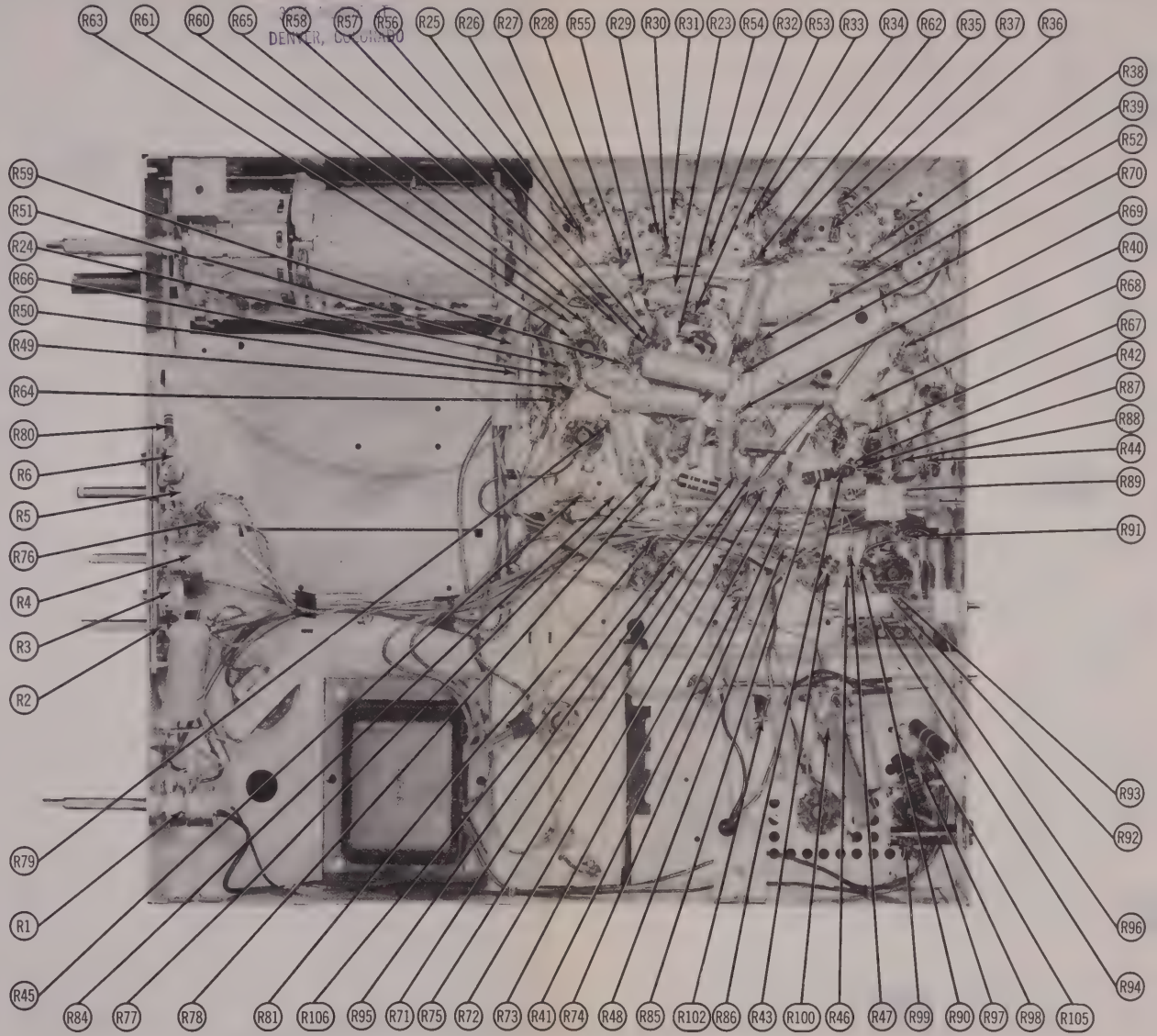
One fuse is used for LV power supply protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by means of a centering lever on the PM focusing assembly. Adjust the centering lever from side to side, and up and down until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

1. Remove 5 push on type control knobs from front panel.
2. Disconnect built-in antenna.
3. Remove 7 wood screws and 1 metal screw. Remove rear cover.
4. Remove 4 wood screws. Remove transmission lines from rear of cabinet.
5. Disconnect speaker plug.
6. Remove 4 chassis bolts Remove chassis.
7. Remove 4 speaker nuts. Remove speaker.



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

SONORA
MODELS 389, 390

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

SONORA
MODELS 389, 390

TRADE NAME	Sonora Models 389, 390
MANUFACTURER	Sonora Radio & Tel. Corp., 325 N. Hoyne Ave., Chicago, Ill.
TYPE SET	AC-DC Operated AM Superheterodyne Receiver
TUBES (Five)	Types 12SA7GT Conv., 12SK7GT IF Amp., 12SQ7GT Det.-AVC-AF Amp., 50L6GT Audio Output 35Z5GT Rectifier
POWER SUPPLY	110-120 Volts AC-DC — RATING .22 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial. Use isolation transformer, if available. If not, connect .1MFD capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to antenna stator lug on tuning gang. Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1620KC	"	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal	"	A5	"

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		SONORA PART No.	STANDARD REPLACEMENT		
V1	Converter	12SA7GT	12SA7GT	8R	
V2	IF Amplifier	12SK7GT	12SK7GT	8N	
V3	Det.-AVC-AF Amp	12SQ7GT	12SQ7GT	8Q	
V4	Audio Output	50L6GT	50L6GT	7S	
V5	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	SONORA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	50	150	N-7889	PRS150/50-30		BBRD-5315		TCD497	TVA-2450	Blue
B	30	150								Red
C2	.05	200	N-1345	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C3	100		N-6015	S1100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C4	.005	600	N-4894	P688-005	D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5	
C5A	250									
B			♦PA-112-2	♦PC-71	♦112TM2	♦1406-02			♦T-2	
C	5000									
C6	.01	400	11-1344	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C7	.05	400	11-1345	489ZX-05	DF-503	CUB4S5		PT415	4TM-S5	
C8	.05	200	11-1346	P288-05	DF-503	PJ2S5		PT415	2TM-S5	

♦ Items C5A, C5B, C5C, R6A and R6B are combined in one unit.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	SONORA PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	N-8732	Q13-133 *	A47-500K-Z*	BSK-60-S *	U-48 *	Volume - 47KΩ Stop
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWE-12	Not Req.	US-26	Attach to R1A

* Insert 47KΩ - 1/2 watt resistor in series with right hand terminal to duplicate stop on original control.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SONORA PART No.	IRC PART No.	
R2	22KΩ	½	N-4025	BTS-22K	
R3	33Ω	½	N-4022	BTS-33	
R4	1 Meg	½	N-1262	BTS-1 Meg	
R5	6.8Meg	½	N-4028	BTS-6.8Meg	
R6A	220KΩ	½	♦	BTS-220K	
B	470KΩ	½		BTS-470K	

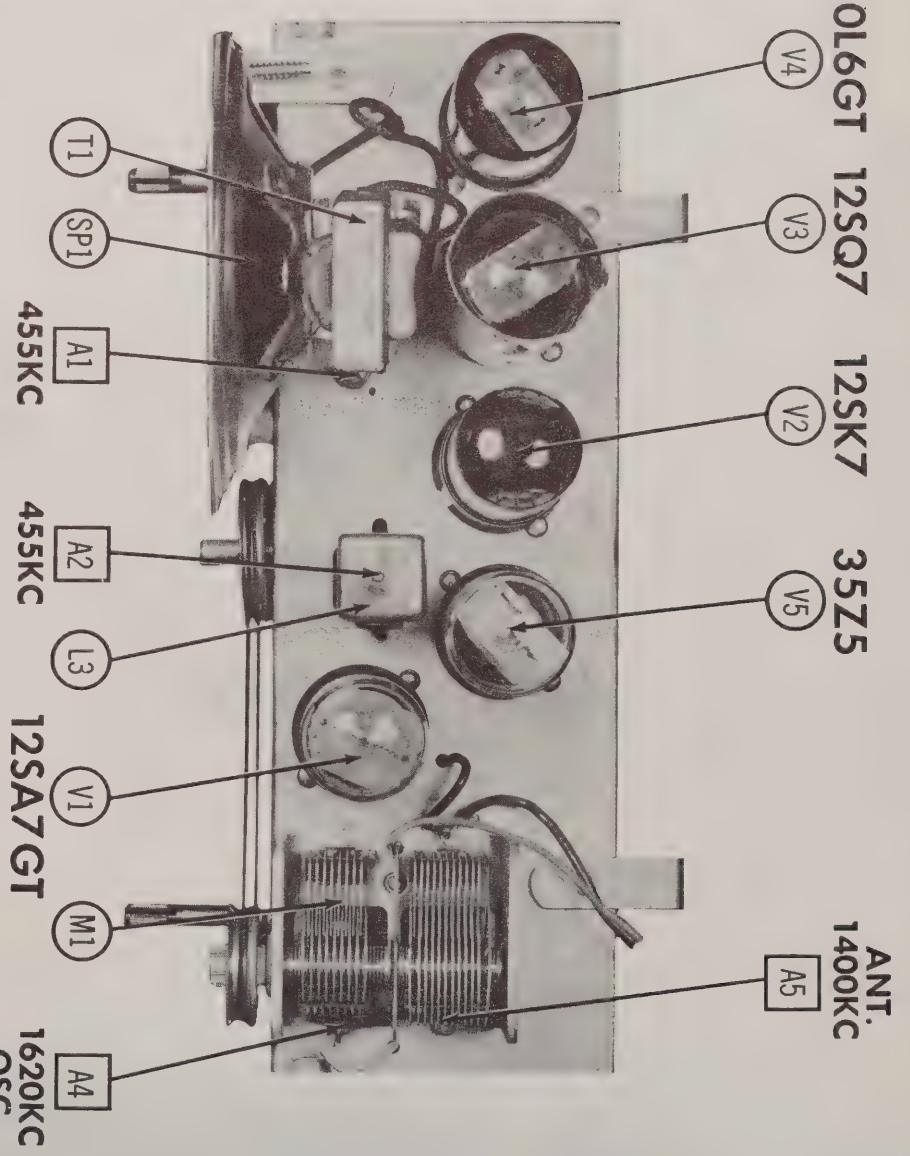
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SONORA PART No.	IRC PART No.	
R7	220Ω	½	N-4024	BTS-220	
R8	1200Ω	1		BTA-1200	
R9	33Ω	½	N-4022	BTS-33	
R10	33Ω	1	N-4068		
R11	220KΩ	½	N-4026	BTS-220K	

♦ Items R6A, R6B, C5A, C5B, C5C are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	SONORA PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T1	2.5KΩ	3.7Ω	Part of speaker	A-3332 ①	A-3025 ①	S-12X ①	Z1101 ①	24S50 ①	① Bend mounting tabs down. File out slots, mount on original mounting bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	SONORA PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.7Ω	N-7824	ST-113 Mod. P4-X	4A07	

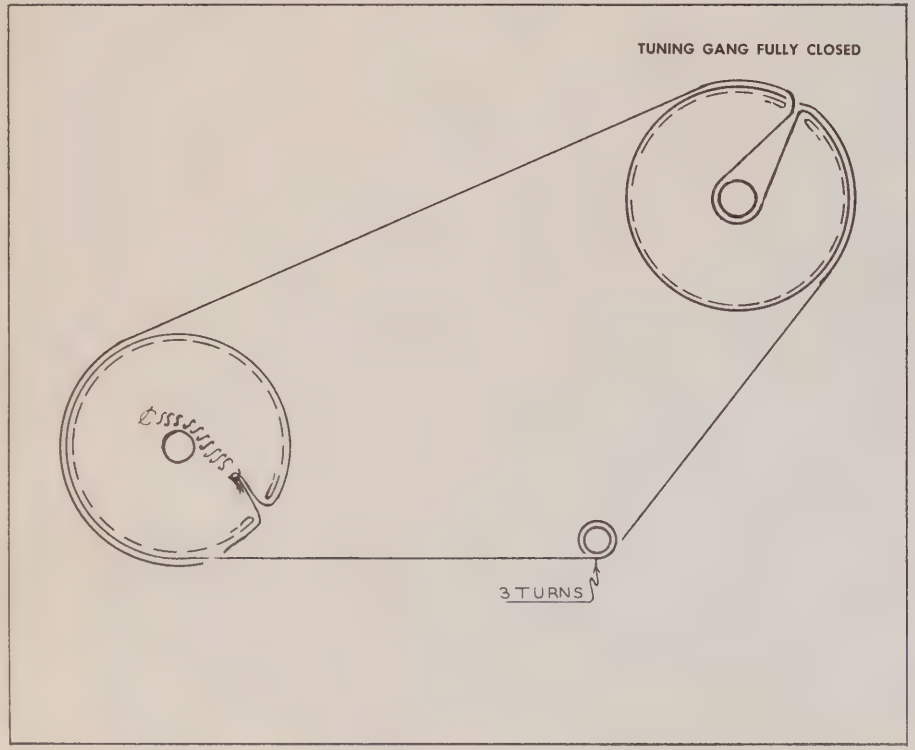
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	SONORA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	3.4Ω		N-8906				Includes cabinet back
L2	Osc. Coil	.6Ω	8Ω	N-8709	14-1073		69-Osc. †	
L3	Input IF	18Ω	16Ω	N-7981	16-6758	BC-352	12-C1	
L4	Output IF	20Ω	20Ω	N-8150	16-6758 *	BC-353 *	12-C2 *	

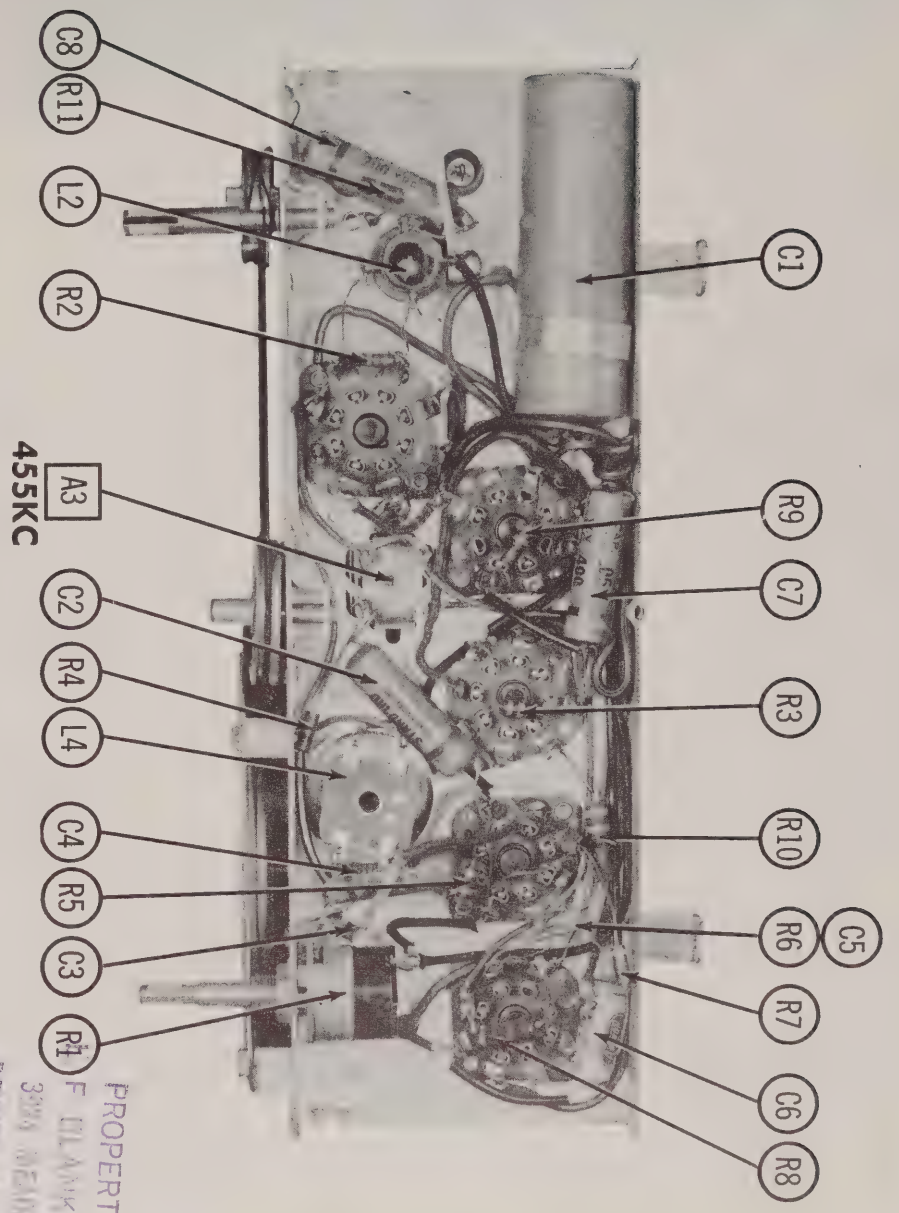
† Drill mounting hole.
* Cut out chassis hole and use clip mounting.

MISCELLANEOUS

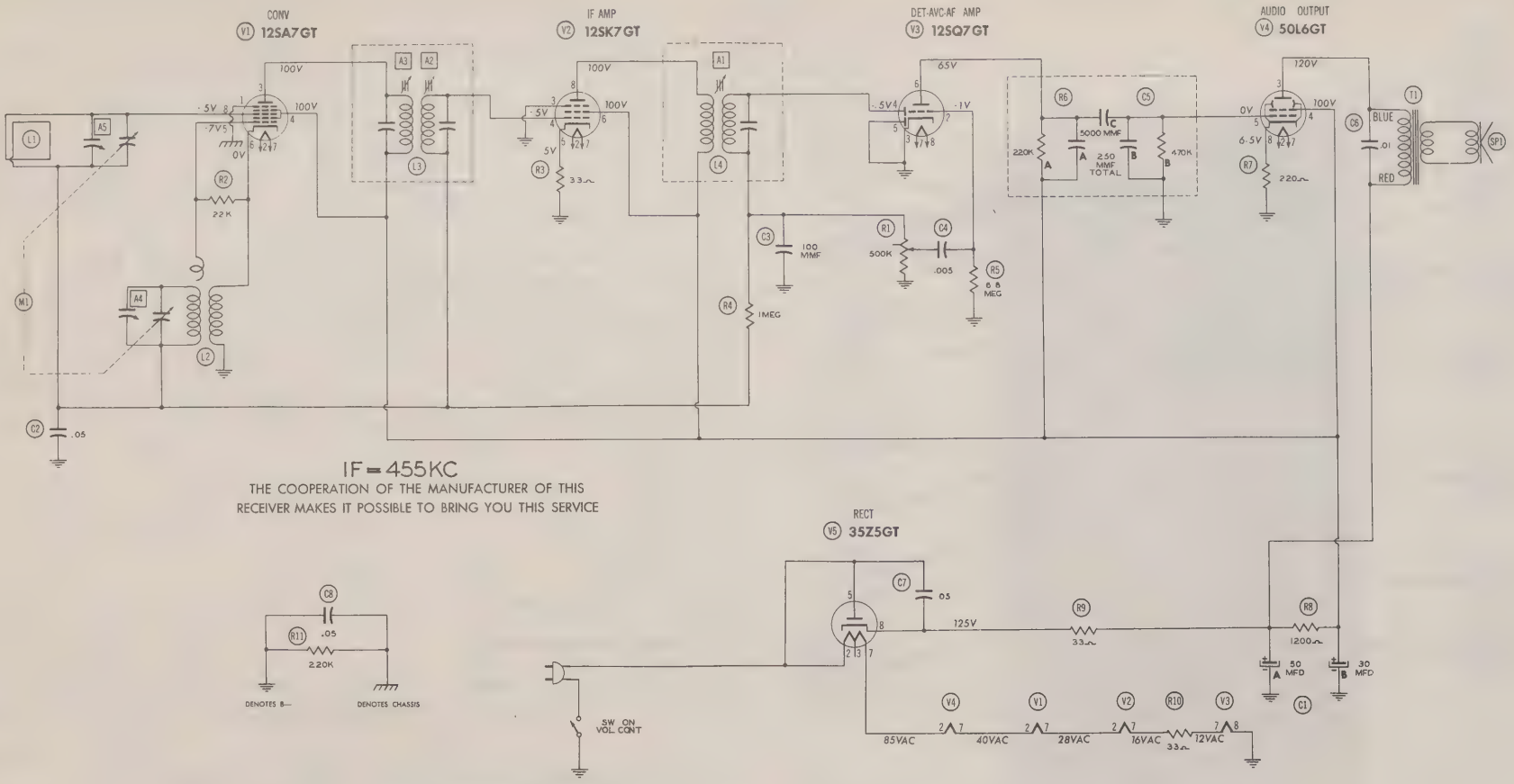
ITEM No.	PART NAME	SONORA PART No.	NOTES
M1	Tuning Cap	N-8745	(36-390MMF) (12-120MMF)



CHASSIS—BOTTOM VIEW



PROPERTY OF
F. ELLANKENSHIP
3226 NEAL ST.
DENVER, COLORADO
SONORA
MODEL 389



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12SA7	0Ω	70Ω	†1.2KΩ	†1.2KΩ	22KΩ	.6Ω	58Ω	1.5Meg
V 2	12SK7	0Ω	58Ω	0Ω	1.5Meg	33Ω	†1.2KΩ	46Ω	†1.2KΩ
V 3	12SQ7	0Ω	6.8Meg	0Ω	500KΩ	0Ω	†220KΩ	12Ω	0Ω
V 4	50L6GT	INF	120Ω	†200Ω	†1.2KΩ	470KΩ	†33Ω	70Ω	220Ω
V 5	35Z5GT	INF	155Ω	150Ω	†33Ω	155Ω	0Ω	120Ω	60KΩ

† MEASURED FROM PIN 8 OF V5

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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STEELMAN
MODELS 3D5, 3D6

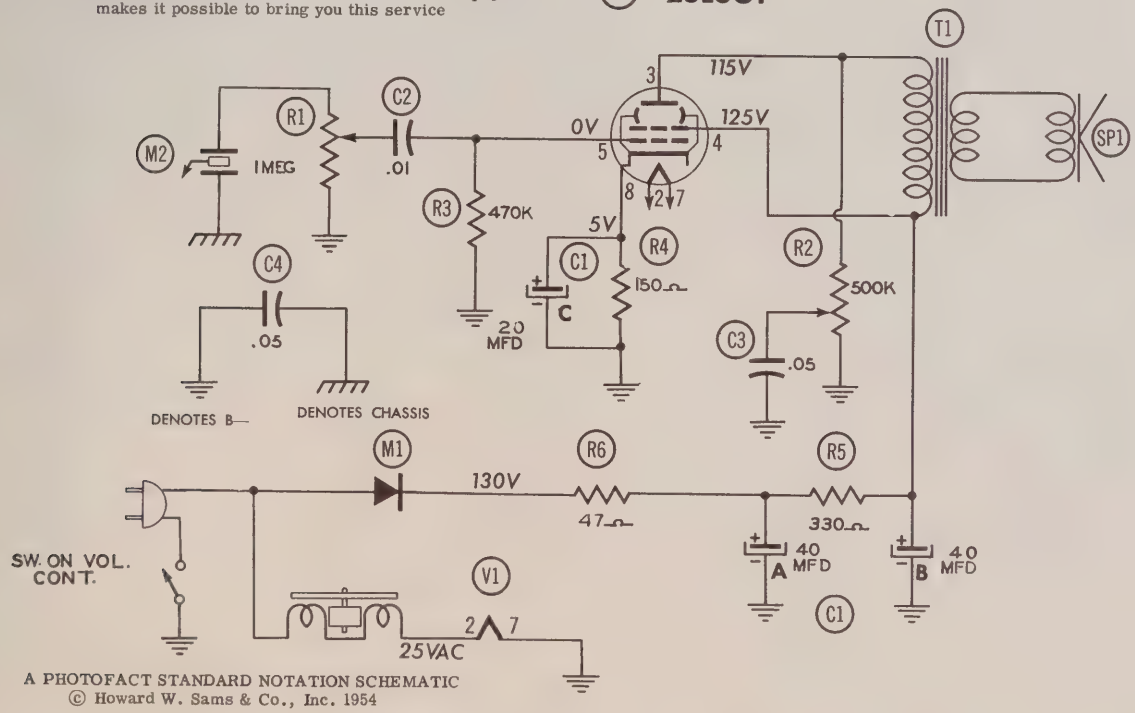
PROPERTY OF
L. F. [illegible]
[illegible]
DENVER, COLORADO

STEELMAN
MODELS 3D5, 3D6

TRADE NAME	Steelman Models 3D5, 3D6
MANUFACTURER	Steelman Phono & Radio Co., Inc., 12-30 Anderson Ave., Mt. Vernon, N.Y.
TYPE SET	AC Operated Phono Amplifier with 3 Speed Manual Player
TUBES (One)	Type 25L6GT Audio Amplifier
POWER SUPPLY	110-120 Volts AC-60 Cycles
RATING	.36 Amp. @ 117 Volts AC

The cooperation of the Manufacturer of this equipment makes it possible to bring you this service

AUDIO AMP
V1 25L6GT



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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		STEELMAN PART No.	STANDARD REPLACEMENT		
V1	Phono Amp.	25L6GT	25L6GT	7S	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	STEELMAN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	40	150		PRS150/50-30		BBRT4421-		3N532	TVA-3448	Red
B	40	150		-20		5C				Blue
C	20	150								Yellow
C2	.01	600		P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C3	.05	400		P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C4	.05	400		P488-05	DF-503	CUB4S5		PT415	4TM-S5	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	STEELMAN PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	1 Meg	½	VC-42	Q13-137	AG-63-Z	BSK-70-S	U-53	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWB	Not Req.	US-26	Attach to R1A
R2A	500KΩ	½	VC-44	Q11-133	AG-58-S	AB-59	U-50	Tone
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R2A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	STEELMAN PART No.	IRC PART No.	
R3	470KΩ	½		BTS-470K	
R4	150Ω	1		BTA-150	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	STEELMAN PART No.	IRC PART No.	
R5	330Ω	1		BTA-330	
R6	47Ω	1			

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	STEELMAN PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T1	2.4KΩ	3.1Ω	Part of speaker	A-3332 ①	A-3025 ①	S-1X, ①	Z-1101 ①		① Bend mounting tabs down, file out slots. Mount on original mounting bracket.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	STEELMAN PART No.	VIKING PART No.	QUAM PART No.	
SP1	4"X6"	PM	3.1Ω	SP-46	46J6	46A07	

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	STEELMAN PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	SELETRON PART No.	
M1	.053 Amp.		1002A	RS65	6S65	65	8J1	

PHONO CARTRIDGE

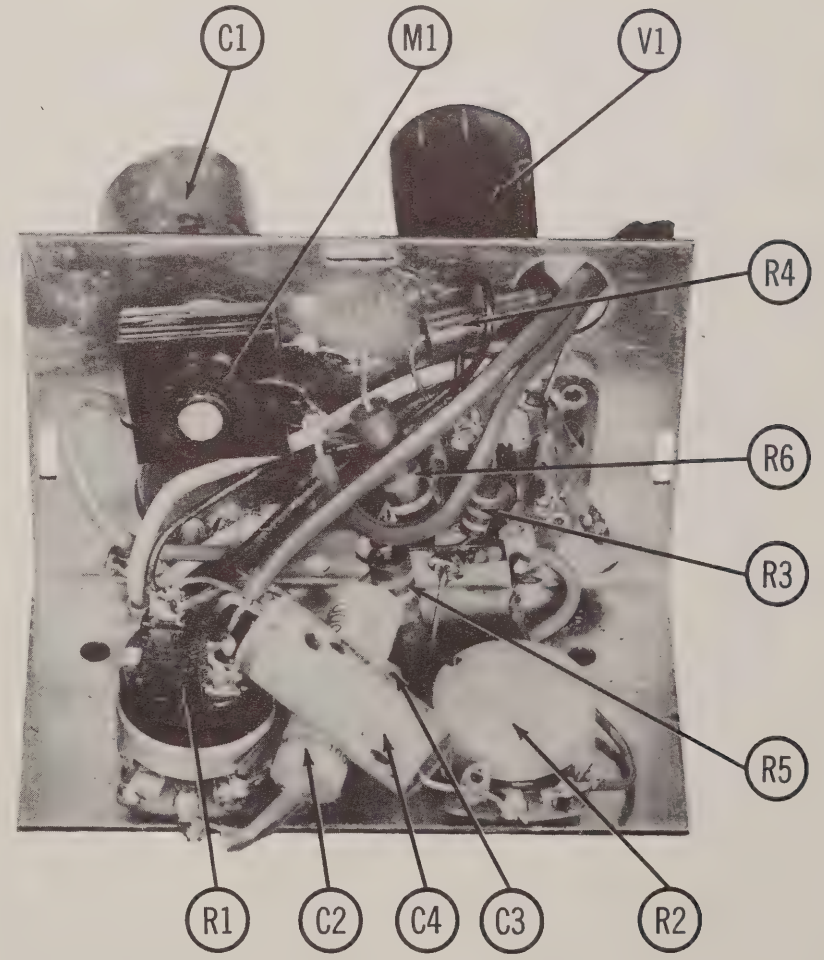
ITEM No.	REPLACEMENT DATA						REMARKS
	STEELMAN PART No.	ASTATIC PART No.		SHURE PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M2		*W15L3-D		*90ID		96-0 *2696-0	0-1 & 0-3	* Complete tone arm and cartridge assembly

ELECTRO-VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

SET 245

FOLDER 8

CHASSIS—BOTTOM VIEW



PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA				REMARKS
	STEELMAN PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	
M3		*W-44 & *W-44LP	*A-432 *C-433	†W-26S or *W-26A & †W-26MGS or *W-26MGA	* Metal † Jewel

PHOTOFACT* Folder

RETMA MEMBER

STEWART-WARNER
MODEL 17T-9380A

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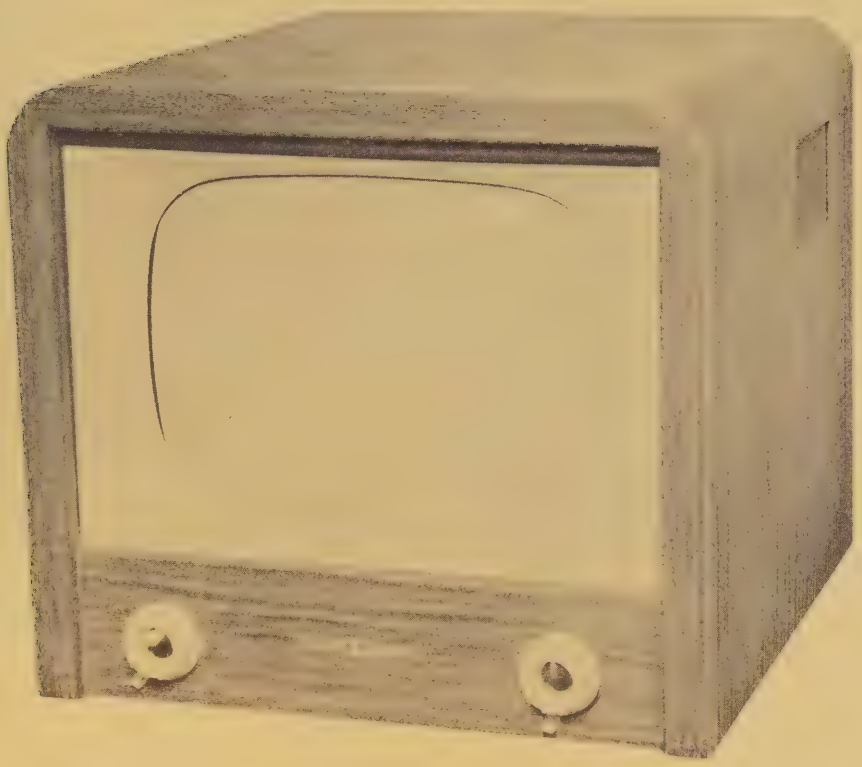

MODEL 17T9380A

STEWART-WARNER
MODEL 17T-9380A

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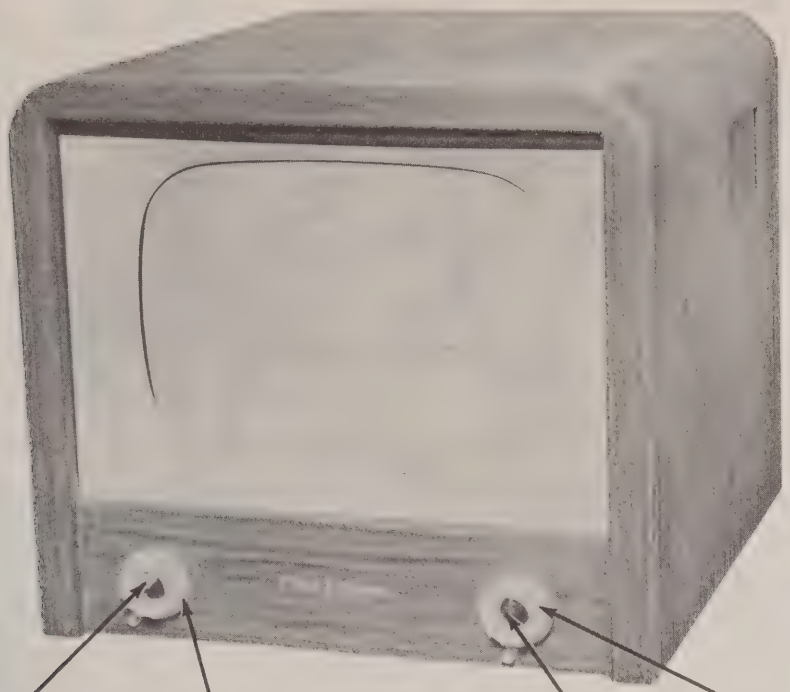
STEWART-WARNER MODEL 17T-9380A



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STEWART-WARNER
MODEL 17T-9380A

TRADE NAME	Stewart-Warner Model 17T-9380A
MANUFACTURER	Stewart-Warner Elect., Div. of Stewart-Warner Corp., 1300 N. Kostner Ave., Chicago 15, Ill.
TYPE SET	Television Receiver
TUBES	Eighteen
POWER SUPPLY	110-120 Volts AC-60 cycle RATING 1.44 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13, Video IF 26.2MC, Sound IF 21.75MC (Intercarrier)

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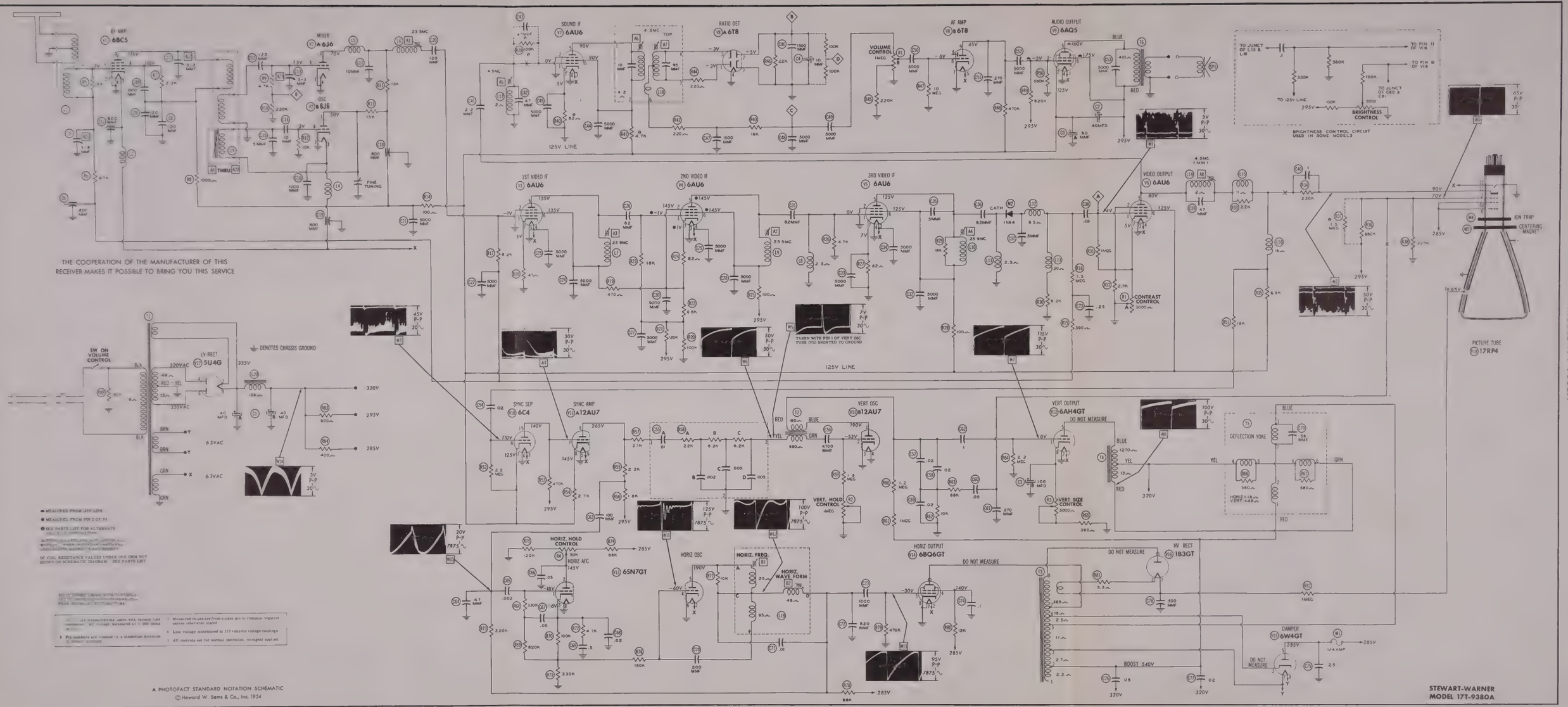
RF AMP
V1 6BC5
MIXER
V2 A 6J6
OSC
V2 B 6J6
SOUND IF
V7 6AU6
RATIO DET
V8 A 6T8
AF AMP
V8 B 6T8
AUDIO OUTPUT
V9 6AQ5
VOLUME CONTROL
1MEG
1ST VIDEO IF
V3 6AU6
2ND VIDEO IF
V4 6AU6
3RD VIDEO IF
V5 6AU6
VIDEO OUTPUT
V6 6AU6
CONTRAST CONTROL
3000
BRIGHTNESS CONTROL CIRCUIT USED IN SOME MODELS
BRIGHTNESS CONTROL
PICTURE TUBE
V18 17RP4
ION TRAP CENTERING MAGNET
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
SW ON VOLUME CONTROL
LV RECT
V11 5U4G
DENOTES CHASSIS GROUND
320VAC
335V
320V
295V
285V
6.3VAC
SYNC SEP
V10 6C4
SYNC AMP
V11 A12AU7
VERT OSC
V11 B12AU7
VERT OUTPUT
V12 6AH4GT
DO NOT MEASURE
VERT. HOLD CONTROL
1MEG
VERT. SIZE CONTROL
5000
DEFLECTION YOKE
HORIZ. HOLD CONTROL
HORIZ AFC
V13 6SN7GT
HORIZ OSC
HORIZ. FREQ.
HORIZ. WAVE FORM
HORIZ OUTPUT
V14 6BQ6GT
HV RECT
V15 1B3GT
DAMPER
V15 6W4GT
BOOST 540V
MEASURED FROM 125V LINE
MEASURED FROM PIN 2 OF V4
SEE PARTS LIST FOR ALTERNATE
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM. SEE PARTS LIST
1 Measured values are from socket pin to common negative unless otherwise stated
2 Pin numbers are counted in a clockwise direction
3 Line voltage maintained at 117 volts for voltage readings
4 All controls set for normal operation, no signal applied
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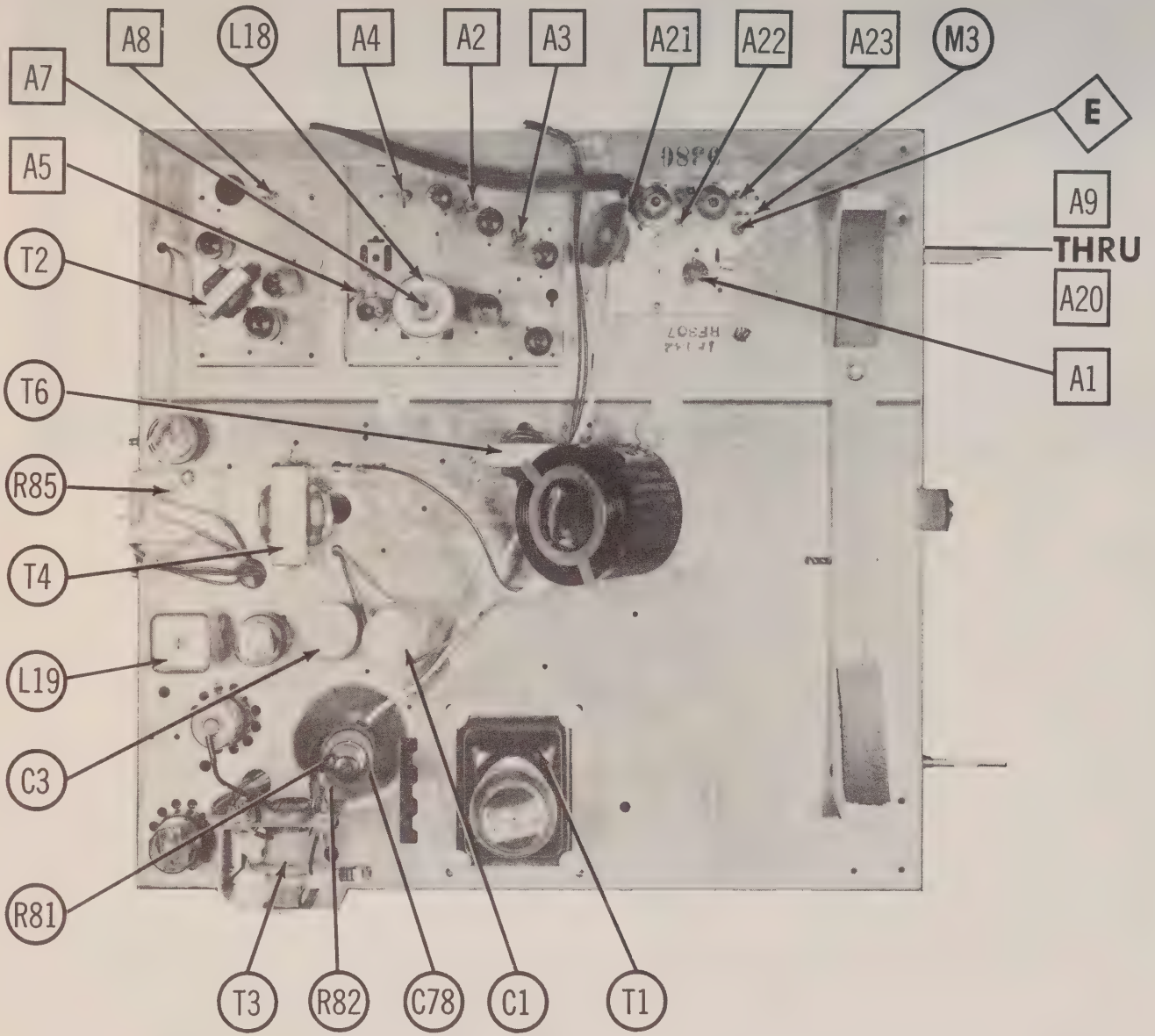
STEWART-WARNER MODEL 17T-9380A
STEWART-WARNER MODEL 17T-9380A



CHASSIS TOP VIEW

MODEL 171-9380A
STEWART-WARNER

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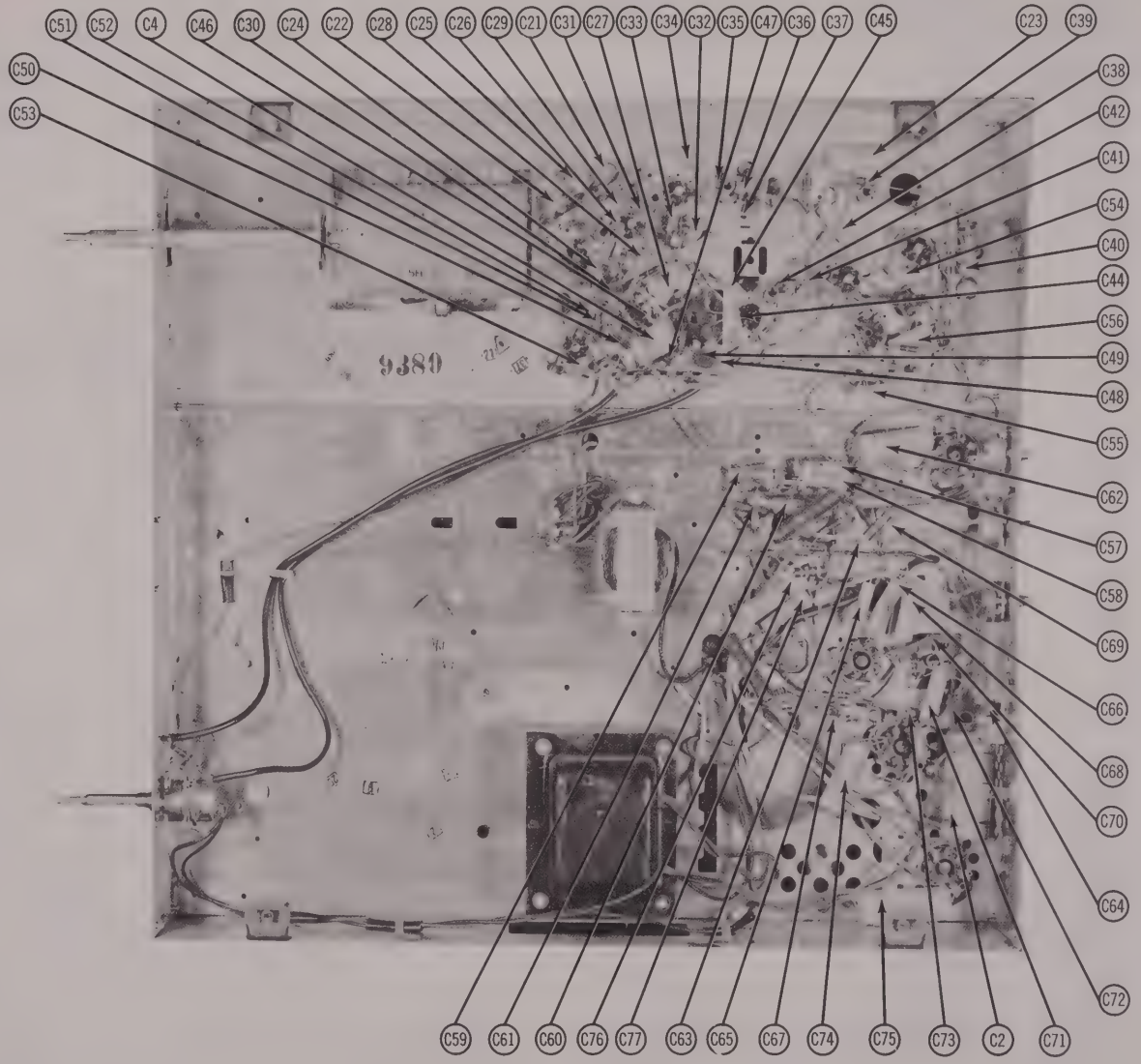

CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

TUBE PLACEMENT CHART

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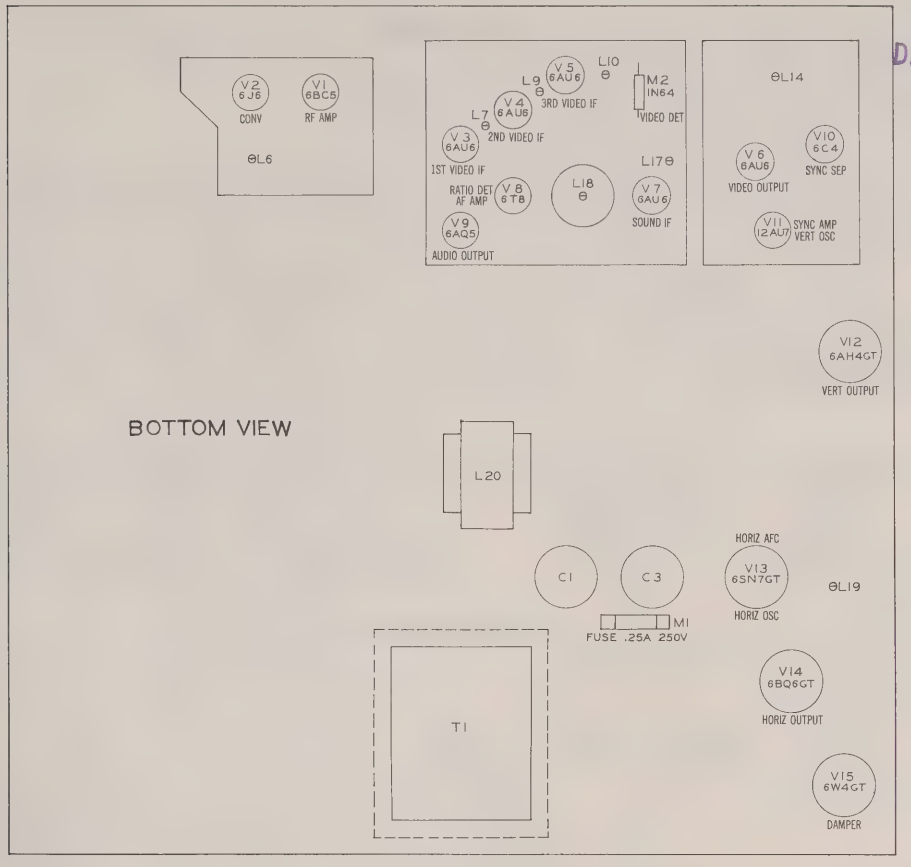

STEWART-WARNER
MODEL 17T-9380A

TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V17

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6, V9
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V18
Has pic, no sound - V7, V8, V9

SYNC FAILURE
No vert. sync - V11
No horiz. sync - V11, V13
No vert. or horiz. sync - V10, V11

SWEEP FAILURE
No raster, has sound - V13, V14, V15, V16, V18 Fuse (M1)
No vertical deflection - V11, V12
Poor vert. linearity or foldover - V11, V12
Poor horiz. linearity or foldover - V13, V14, V15
Narrow picture - V13, V14, V15, V16, V17
Vert. off freq. - V11
Horiz. off freq. - V11, V13

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal oscillator tube (V13) to disable the high voltage.

VIDEO IF ALIGNMENT

Remove the converter tube (V2) from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
An alternate method of disabling the local oscillator is to place a piece of transparent cellulose tape on the first two contacts (from front of drum assembly) of any channel strip and then switching the tuner to the insulated strip.
Short the antenna terminals with a jumper wire.
Connect the negative lead of 3 volt battery to the ungrounded side of C23. Connect positive lead to chassis.
Use Stewart-Warner alignment tool (#507479 or equivalent).
When the IF channel is badly misaligned, two or more stages may break into oscillation as evidenced by excessive voltage at point (A). This voltage will be unaffected by strength of signal from generator.
In such cases the condition may generally be corrected by detuning the IF coils in different directing. If the oscillation persists increase the AGC bias from -3 volts to -4.5 volts. Once the stages have been aligned and become stable reduce the fixed bias to -3 volts and repeat the IF alignment.
Use only enough generator output to produce a useable indication on scope or VTVM.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to ungrounded tube shield floating over dummy converter tube. Low side to chassis.	23.5MC (Unmod)	Any	DC probe thru 10KΩ to point (A). Common to chassis.	A1, A2	Adjust for maximum deflection.
2.	"	"	25.9MC	"	"	A3, A4	"

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
3.	Direct	High side to ungrounded tube shield floating over dummy converter tube. Low side to chassis.	24MC (10MC Swp)	21.7MC 26.2MC	Any	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.		Check for response curve similar to Fig.1. If necessary, retouch A1 thru A4 to obtain desired response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Set contrast control to its fully counter clockwise position.
Connect two matched 100KΩ (±1%) resistors in series from point (B) to chassis. The junction of these two resistors is alignment point (D) as shown on the schematic.
Short antenna terminals to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
4.	.001MFD	High side to point (A). Low side to chassis.	4.5MC (Unmod)	Any	DC probe thru 10KΩ to point (B). Common to chassis.	A5, A6	Adjust for maximum deflection.
5.	"	"	"	"	DC probe thru 10KΩ to point (C). Common to point (D).	A7	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.
Short antenna terminals to chassis.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	.001MFD	High side to point (A). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. thru 10KΩ to point (B). Low side to chassis.	A5, A6	Disconnect stabilizing capacitor C4. Adjust for curve of maximum amplitude and symmetry similar to Fig. 2.
5.	"		"	"	"	Vert. Amp. thru 10KΩ to point (C). Low side to chassis.	A7	Reconnect stabilizing capacitor C4. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 3. SLIGHTLY retouch A6 for maximum amplitude and straightness of crossover lines.

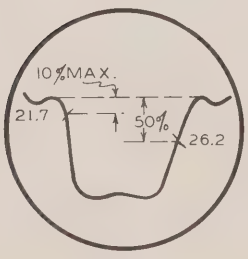

FIG. 1

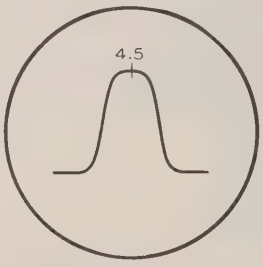

FIG. 2

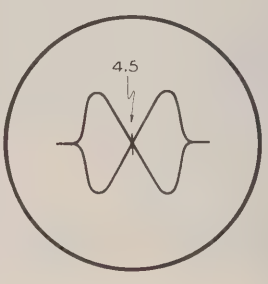

FIG. 3

ALIGNMENT INSTRUCTIONS (cont)

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4.5MC TRAP ALIGNMENT

Remove 6AU6 (V4) from its socket.
Short antenna terminals to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
6.	.001MFD	High side to point (A). Low side to chassis.	4.5MC (Unmod)	Any	DC probe thru detector (Fig.4) to pin 11 of picture tube.	A8	Adjust for MINIMUM deflection. Replace V4 in its socket.

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket or remove cellulose tape from tuner strip.
The channel oscillator adjustments are reached thru a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible thru this hole as the channel switch is turned to each channel.
Leave the bias battery connected as under "Video IF Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.
Use only enough sweep generator output to provide useable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	195MC (10MC Swp)	193.25MC 197.75MC	10	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A9	Adjust to place sound marker as shown in Fig. 5. Video marker should be at 50%.
			213MC (10MC Swp)	211.25MC 215.75MC	13		A10	
			207MC (10MC Swp)	205.25MC 209.75MC	12		A11	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A12	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A13	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A14	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A15	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A16	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A17	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A18	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A19	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A20	

RF AND MIXER ALIGNMENT

Leave bias connected as under "Video IF Alignment".
Use only enough sweep generator output to provide useable pattern on scope.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	195MC (10MC Swp)	193.25MC 197.75MC	10	Vert. Amp. thru 10KΩ to point (E). Low side to chassis.	A21 A22 A23	Adjust for response curve similar to Fig. 6.
9.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response curve similar to Fig. 6. If markers fall below 70% on any channel make slight compromise adjustments of A21, A22 and A23 with channel switch set to that channel then recheck all other channels to see that they have not been seriously affected.
			207MC (10MC Swp)	205.25MC 209.75MC	12			
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

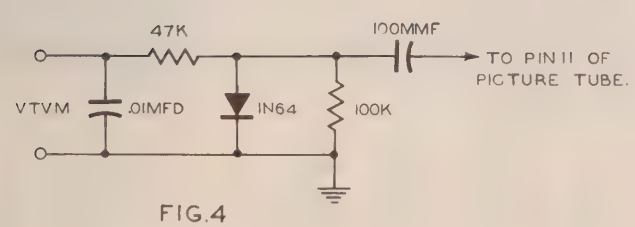


FIG.4

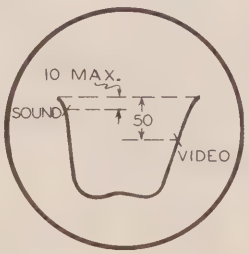


FIG.5

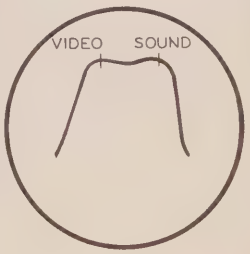
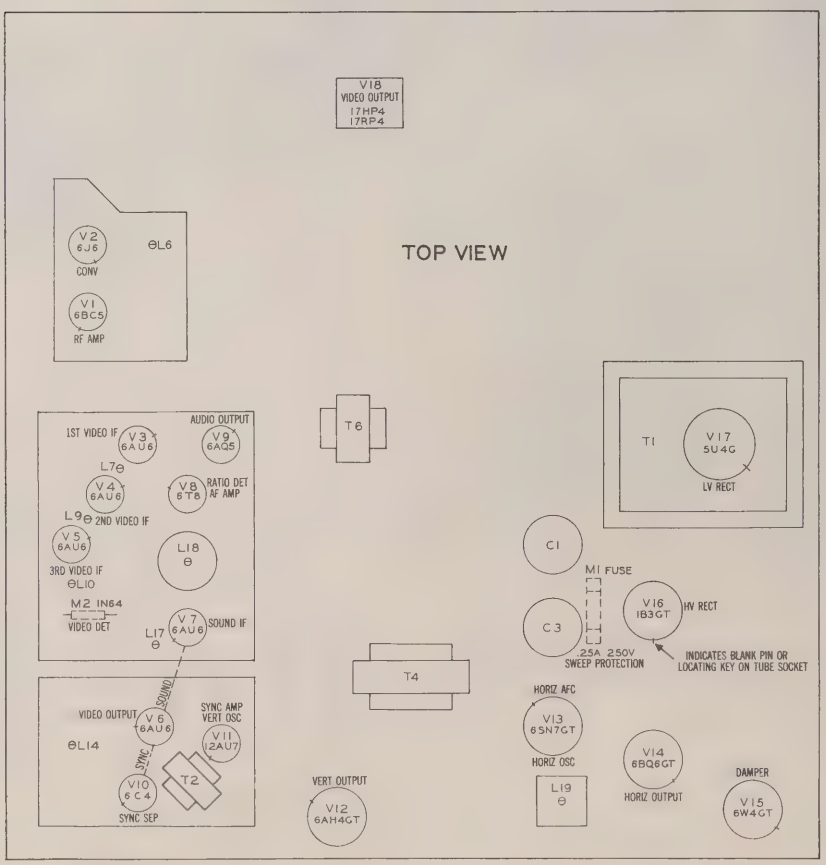


FIG.6

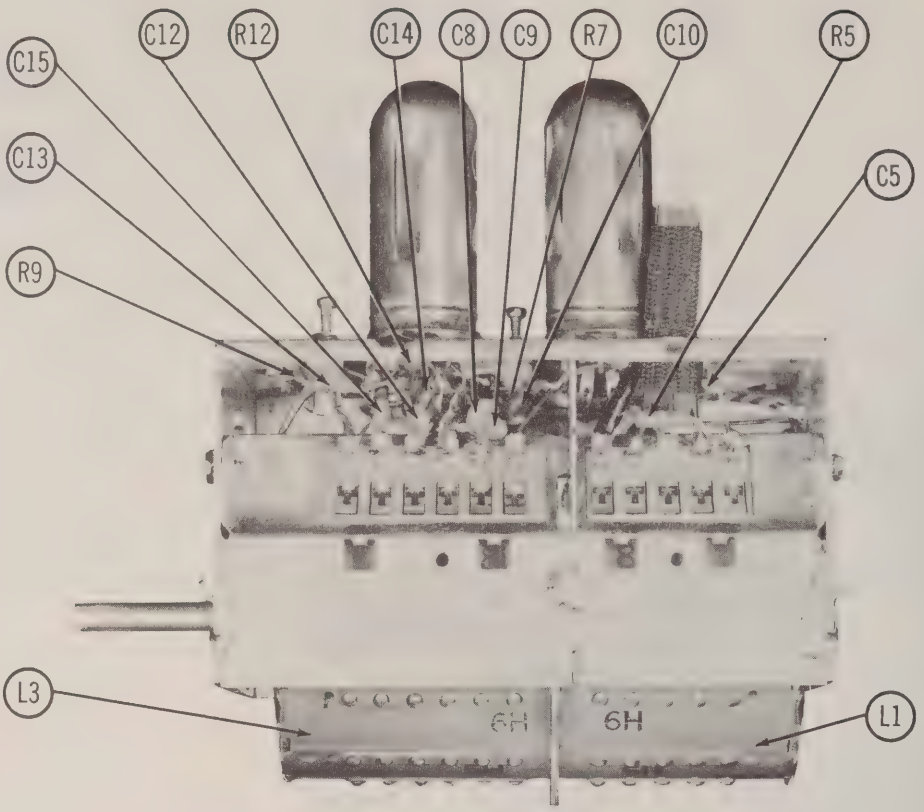
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BC5	1.5Meg	0Ω	.1Ω	0Ω	■ 1.1KΩ	■ 3.3KΩ	0Ω		
V 2	6J6	■ 15KΩ	■ 15KΩ	.1Ω	0Ω	225KΩ	10KΩ	0Ω		
V 3	6AU6	1.5Meg	0Ω	0Ω	.1Ω	▲ 470Ω	▲ 470Ω	47Ω		
V 4	6AU6	80KΩ	† 120KΩ	0Ω	.1Ω	† 800Ω	† 800Ω	▲ 82Ω		
V 5	6AU6	2.5Ω	0Ω	.1Ω	0Ω	■ 100Ω	■ 100Ω	82Ω		
V 6	6AU6	1 Meg	450Ω	0Ω	.1Ω	■ 7KΩ	■ 0Ω	450Ω		
V 7	6AU6	2Ω	0Ω	.1Ω	0Ω	■ 4.7KΩ	■ 4.7KΩ	82Ω		
V 8	6T8	INF	22KΩ	INF	0Ω	.1Ω	INF	0Ω	10 Meg	■ 470KΩ
V 9	6AQ5	330KΩ	200KΩ	.1Ω	0Ω	† 1.1KΩ	† 700Ω	330KΩ		
V 10	6C4	† 470KΩ	INF	.1Ω	0Ω	† 470KΩ	■ 2.2Meg	■ 0Ω		
V 11	12AU7	◓ 2.2Meg	2.2Meg	0Ω	0Ω	0Ω	† 4.1KΩ	† 470KΩ	■ 2.7KΩ	.1Ω
V 12	6AH4GT	2.2Meg	0Ω	INF	INF	† 1.4KΩ	INF	.1Ω	1.8KΩ	
V 13	6SN7GT	1.5 Meg	† 85KΩ	430KΩ	480KΩ	† 70KΩ	0Ω	.1Ω	0Ω	
V 14	6BQ6GT	INF	.1Ω	INF	† 12.5KΩ	420KΩ	INF	0Ω	0Ω	TOP CAP ◓ 16Ω
V 15	6W4GT	† 500Ω	INF	INF	INF	† 500Ω	† 500Ω	◓ 10Ω	◓ 10Ω	
V 16	1B3GT	PINS 1-8 HAVE INF. RESISTANCE								TOP CAP ◓ 380Ω
V 17	5U4G	INF	80KΩ	INF	53Ω	INF	50Ω	INF	80KΩ	
V 18	17RP4	0Ω	220KΩ	PIN 6 500Ω	PIN 10 500Ω	PIN 11 ■ 230KΩ	PIN 12 .1Ω			

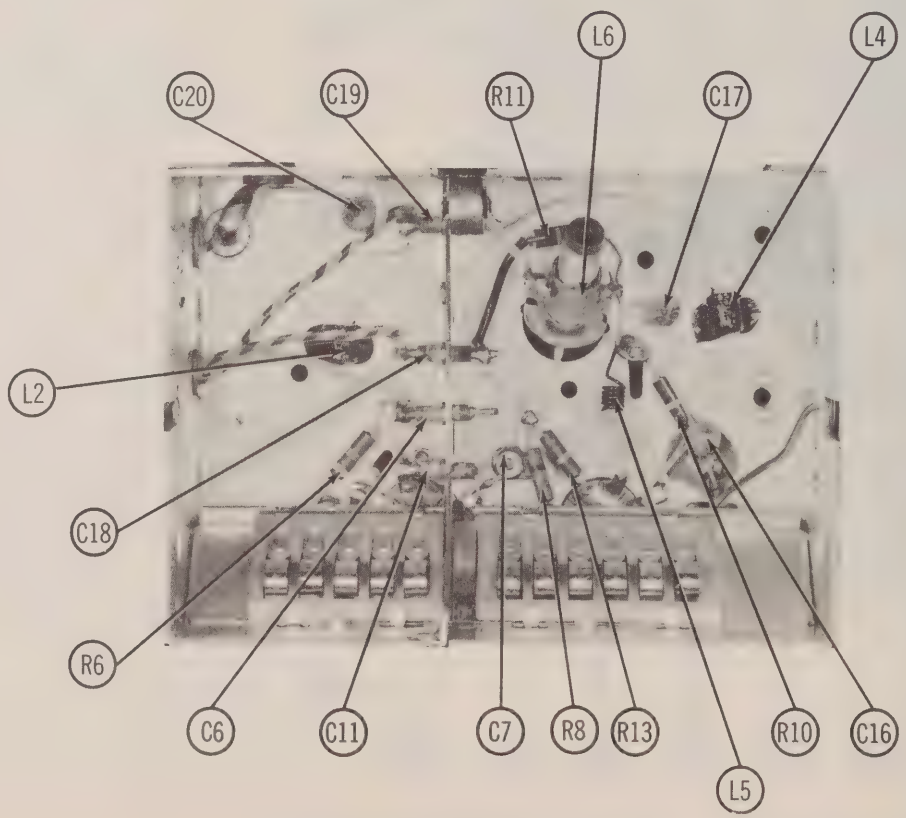
■ MEASURED FROM 125 line.
▲ MEASURED FROM PIN 2 of V4.
† MEASURED FROM PIN 8 OF V17.
◓ MEASURED FROM PIN 3 OF V15.



TUBE PLACEMENT CHART

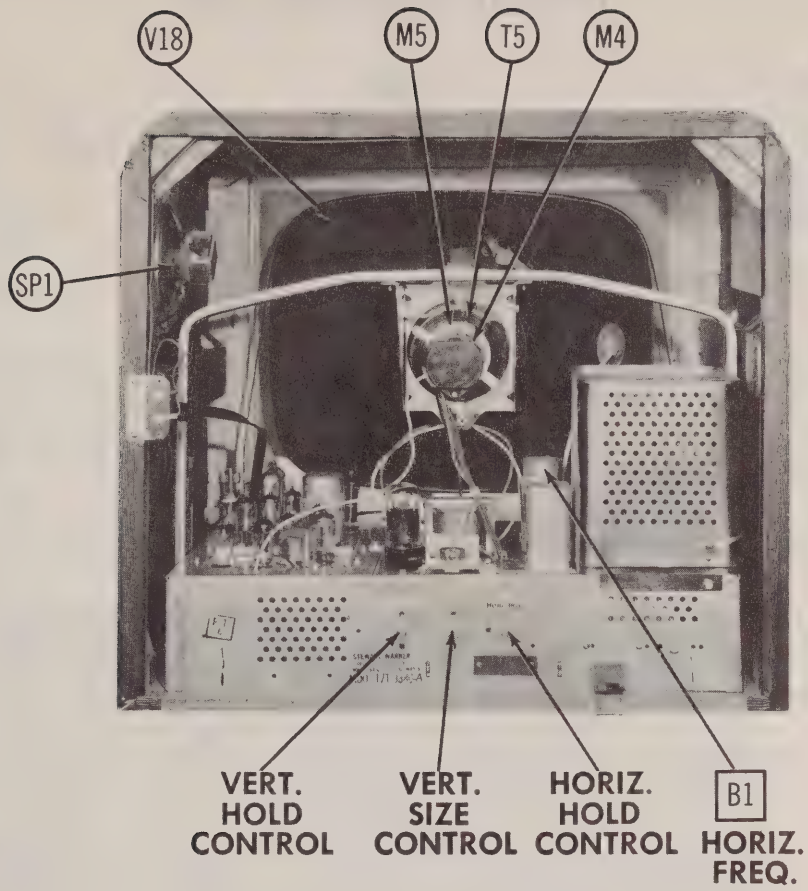


RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW

PROPERTY OF
L. TV & APPLIANCE SHOP
3821 BEAUDE ST.
DENVER, COLORADO



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

1. Set the horizontal frequency slug (B1) and the waveform slug (B2) at their maximum counter clockwise positions.
2. Short together terminals "C" and "D" of the horizontal oscillator coil, L19.
3. Set the horizontal hold control to its maximum counter clockwise position.
4. Adjust B1 clockwise until picture just locks in horizontally.
5. Remove short from terminals "C" and "D" of L19. If picture loses sync with short removed, adjust B2 clockwise until picture falls into sync.
6. Connect the vertical input lead of an oscilloscope to terminal "C" of L19. Adjust the waveform slug (B2) clockwise until the broad and narrow peaks are of equal amplitude as shown in Fig. 7. While adjusting B2 keep the picture in sync by turning the horizontal hold control clockwise. Disconnect scope from receiver.
7. Set the horizontal hold control clockwise and adjust B1 until picture locks in and remains in sync when switching off channel. Turn B1 slowly counter clockwise until picture just begins to lose sync.
8. The horizontal holding action should be at follows:
   a. With horizontal hold control fully counter clockwise switch off channel and back. The picture should be out of sync or just pulling out of sync.
   b. With horizontal hold control fully clockwise the picture may lose sync when switching off channel and back.
   c. With horizontal hold control at mid-position the picture should fall in sync when switching off channel and back again.

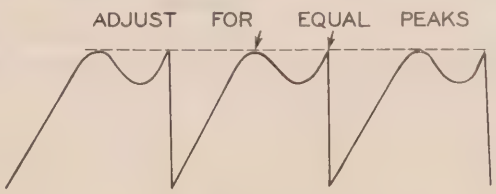


FIG. 7

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage .

INSUFFICIENT SWEEP

Check by substitution V13, V14, V15 and V17. Check waveform W13.

If Satisfactory	If Unsatisfactory
Check T3, T5A, C76, C77, C74, R80 and other associated components.	Check C73, C72, R79. Check waveform for peak to peak voltage and other associated components for failure or change of value.

DRIVE LINES

Check by substitution V14 and V15. Check T3, C72 and other associated components. Check waveform for peak to peak voltage.

COMPRESSED LEFT SIDE

Check by substitution V13, V14 and V15. Check components associated with the horizontal output and damper stages especially T3 and T5A.

FOLDS

Follow procedure outlined under "Drive Lines .

PIE CRUST EFFECT

Check by substitution V14 and V15. Check T3, T5A for internal arcing.

XMAS TREE EFFECT

Substitute V13. Check C71, C68, C66, L19 and other associated components.

VERTICAL

LOSS OF SWEEP

Check by substitution V11B and V12. Check waveform W7.

If Satisfactory	If Unsatisfactory
Check T4, T5A and other associated circuit components.	Check T2, C62, R60, R61 and other associated circuit components.

INSUFFICIENT SWEEP

Check vertical size control for proper adjustment. Proceed as outlined under "Loss of Sweep"

COMPRESSED AT BOTTOM

Check by substitution V11B and V12. Check C3B, R65, R3A and other associated circuit components.

COMPRESSED AT TOP

Check by substitution V11E and V12. Check R60, R61, T5B and other associated circuit components.

FOLDS

Check by substitution V11E and V12. Check C3E, T5B, T2, T4. Check associated components for failure or change of value.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V10 and V11A. Check C54, R51, R52, R53, R58 and other associated components.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Check by substitution V11 and V12. Check waveform W6.

If Satisfactory	If Unsatisfactory
Check components associated with V11B, especially T2 and R59.	Check vertical integrator and other associated components. Check IF stages for overloading.

LOSS HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Check by substitution V13 and V14. Check waveform W12.

If Satisfactory	If Unsatisfactory
Check components associated with V13 especially C63 and C65.	Check C70, C68, R75, R72, and other associated components.

HORIZONTAL BENDING

Check by substitution V10, V11A and V13. Check horizontal AFC network for component failure or change of value.

VIDEO

LOSS OF VIDEO

Substitute V6. Check coupling networks to picture tube. Check picture tube and other components associated with V6.

SOUND BARS (4.5MC BEAT)

Adjust fine tuning control for best picture and sound. Check adjustment A8, and video IF alignment.

POOR CONTRAST

Substitute V6. Check video detector crystal. Check contrast control, picture tube and other associated circuits components.

NEGATIVE PICTURE

Check by substitution V3, V4, V5 and V6. Check picture tube. Check video crystal diode. Check AGC network.

SMEAR

Substitute V6. Check L14, L15, L16, R33, R34, C39, C40 and other associated circuit components.

WIDE BLACK BAR ACROSS PICTURE

Check V3, V4, V5 and V6 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V7, V8 and V9. Check C41, C49, C50, C52, R48. Check speaker and other associated components.

BUZZ

Adjust fine tuning for best picture and sound. Adjust A7 for minimum buzz. Substitute V8. Check alignment of IF stages.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

PROPERTY OF
L. P. BLANKENSHIP
3024 MEADE ST.
DENVER, COLORADO

CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

STEWART-WARNER
MODEL 171-9380A

ERTY OF
ANKENSHIP
ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No	USE	REPLACEMENT DATA: Stewart-Warner PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	6BC5	6BC5	7BD	
V2	Converter	6J6	6J6	7BF	
V3	1st. Video IF Amp.	6AU6	6AU6	7BK	
V4	2nd. Video IF Amp.	6AU6	6AU6	7BK	
V5	3rd. Video IF Amp.	6AU6	6AU6	7BK	
V6	Video Output	6AU6	6AU6	7BK	
V7	Sound IF Amp.	6AU6	6AU6	7BK	
V8	Ratio Detector-AF Amplifier	6T8	6T8	9E	
V9	Audio Output	6AQ5	6AQ5	7BZ	
V10	Sync Separator	6C4	6C4	9BG	
V11	Sync Amplifier-Vert. Oscillator	12AU7	12AU7	8A	
V12	Vert. Output	6AH6GT	6AH6GT	8EL	
V13	Horiz. AFC-Horiz.Oscillator	6SN7GT	6SN7GT	8BD	
V14	Horiz. Output	6BQ6GT	6BQ6GT	8AM	
V15	Damper	6W4GT	6W4GT	6CG	
V16	HV Rectifier	1B3GT	1B3GT	3C	
V17	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: Stewart-Warner PART No	CBS-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V18	17RP4		17RP4 17EP4	17RP4 17HP4	17EP4	12L 12L	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Stewart-Warner PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	±40	450	521578	AFH2-57		B045		FP338	TVL-3764	
B	±40	450								
C2	40	300	160095	PRS450/40		BR4035		TC78	TVA-1611	
C3A	±40	250	509002	AFH3-90		B087		FP329.6	TVL-3802	
B	±100	50						TC58		
C4	10	150	505174	PRS150/12		BR1015		TC42	TVA-1406	
C5	3-8		509084		829-10					
C6	800			KF-001	MFT-1000				503C-D1	
C7	.5-3		507968		829-3		3115-01-GR5	CT565A		
C8	120		513049	BPD-00012	D6-121	G044	GP2K-121	UC-5312	5GA-T12	
C9	120		513049	BPD-00012	D6-121	G044	GP2K-121	UC-5312	5GA-T12	
C10	1000		513041	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C11	800			KF-001	MFT-1000				503C-D1	
C12	120		513049	BPD-00012	D6-121	G044	GP2K-121	UC-5312	5GA-T12	
C13	.5-3		507968		829-3		3115-01-GR5	CT565A		
C14	10		520718	SH10N750	TCN-10	N018	N750K-100	NT-541	5TCU-Q1	
C15	5		513460							
C16	1000		513041	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C17	10		520718	SH10NP0	TCZ-10	Z018	NP0K-100	ZT-541	5TCC-Q1	
C18	800			KF-001	MFT-1000				503C-D1	
C19	800			KF-001	MFT-1000				503C-D1	
C20	120		513456	BPD-00012	D6-121	G044	GP2K-121	UC-5312	5GA-T12	
C21	5000		513013	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C22	5000		513013	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C23	.25	200	512044	P288-25		CUB3P25	PT4025		2TM-P25	
C24	5000		513013	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C25	5000		513013	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C26	82		513016	S82	D6-820	G040	GP1K-820		5GA-Q82	
C27	5000		513013	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C28	5000		513013	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C29	5000		513013	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C30	5000		513013	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C31	82		513016	S82	D6-820	G040	GP1K-820		5GA-Q82	
C32	5000		513013	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C33	5000		513013	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C34	5000		513013	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C35	5		513432	S5N5P0	TCZ-4.7	TZ07	NP0K-050	ZT-555	5TCCB-V47	
C36	82		513016	S82	D6-820	G040	GP1K-820		5GA-Q82	
C37	5		513432	S5N5P0	TCZ-4.7	TZ07	NP0K-050	ZT-555	5TCCB-V47	
C38	.05	200	512026	P288-05	DF-503	CUB3S5		PT415	2TM-S5	
C39	47		513438	S47NP0	TCZ-47	TZ22	NP0K-470	ZT-5447	5TCC-Q47	
C40	.1	200	512032	P288-1	DF-104	CUB2P1		PT401	2TM-P1	
C41	2.2		512001	S22.5NP0	TCZ-2.2	TZ05	NP0K-2R2		5TCCB-Y22	
C42	47		513438	S47NP0	TCZ-47	TZ22	NP0K-470	ZT-5447	5TCC-Q47	
C43	47		513002	S47NP0	TCZ-47	TZ22	NP0K-470	ZT-5447	5TCC-Q47	Note 1
C44	5000		513013	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C45	5000		513013	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C46	1500		513010	S1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C47	1500		513010	S1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C48	5000		513013	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C49	5000		513013	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C50	5000		513013	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C51	270		513006	S270	D6-271	TP41	GP2K-371	UC-5327	5GA-T27	
C52	5000		513013	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C53	5000		513013	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C54	.02	300	512014	P288-02	DF-203	CUB2S2	817-02	PT412	2TM-S2	
C55A	.01							PT611		
B	.002		⊕508062	†BPD-01	†DD-103	†K082	†811-01	PT833	†5HK-B1	
C	.006			PA-110	FC-100	115TM1	1405-01	PT835	10IC1	
D	.005							PT625		
C56	4700	1000	512533							
C57	.02	400	512016		P488-02	DF-203	CUB4S2	817-02	PT412	4TM-S2
C58	.02	400	512016		P488-02	DF-203	CUB4S2	817-02	PT412	4TM-S2
C59	.02	300	512014		P288-02	DF-203	CUB2S2	817-02	PT412	2TM-S2
C60	.05	200	512026		P288-05	DF-503	CUB2S5		PT415	2TM-S5
C61	270		513006		S270	D6-271	TP41	GP2K-271	UC-5327	5GA-T27
C62	.1	600	512036		P688-1	DF-104	CUB6P1		PT601	6TM-P1
C63	100	500	512502		1468-0001	D6-101	5W5T1	GP1K-101	MC235	1TM-31

CAPACITORS (cont)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Stewart-Warner PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C64	47		513030	SH47NP0	TCZ-47	TZ22	NP0K-470	ZT-5447	5TCC-Q47	
C65	.002	600	512002		P688-002	D6-202	CUB6D2	GP2-333-202	PT622	6TM-D2
C66	.05	200	512028		P288-05	DF-503	CUB2S5		PT415	2TM-S5
C67	.05	400	512028		P488-05	DF-503	CUB4S5		PT415	4TM-S5
C68	.02	400	512016		P488-02	DF-203	CUB4S2	817-02	PT412	4TM-S2
C69	.5	200	512060		P288-5		CUB2P5		PT405	2TM-P5
C70	200		513437							
C71	.01	600	512311		P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1
C72	820	500	512547				IR5T82			
C73	1000		513009		S1000	D6-102	TP52	GP2L-102	UC-521	5HK-D1
C74	.1	600	512036		P688-1	DF-104	CUB6P1		PT601	6TM-P1
C75	.25	600	512048		S64-25		CUB6P25		PT6025	6TM-P25
C76	.05	600	512030		P688-05		CUB6S5		PT615	6TM-S5
C77	.02	600	512018		P688-02		CUB6S2		PT612	6TM-S2
C78	500	20000	520990		HV20C	TV3-502	MMU20T5	413	HV20035A	20DK-T5
C79	50	2000	513027					3KV-550		20GA-Q68

Note 1. Used when series designation stamped on chassis includes letter "A".
⊕ Items C55A, C55B, C55C, C55D, R58A, R58B, R58C are combined in one unit.
† To replace Mfgr's original part, install 10000MMF capacitor in series with C-R unit input lead.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: Stewart-Warner PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	30000	½	-522368	* QJ-523	RTV-451		UF33L	Contrast - Panel
B	1 Meg	½					UR16-T1253 ††	Volume tapped at 100K - Rear
C	Switch						UB-26	Attach to R1B
R2A	1 Meg	½	522349	QU-137	A47-1 Meg-S	AB-69	U-54	Vert. Hold
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R2A
R3A	5000Ω	½	520945	QU7-114	A47-5000-S	AB-12	SU-14	Vert. Size
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R3A
R4A	50KΩ	½	520943	QU-123	A47-50K-S	AB-31	U-35	Horiz. Hold
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R4A

* CONCENTRIKIT EQUIVALENT KIT K-2 BASE ELEMENTS & SHAFTS B11-112 & P1-123 (Panel)
B13-137 & R1-216 (Rear) & SWITCH 76-1.
† Universal replacement (Mallory exact duplicate Part No. UE40S)

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Stewart-Warner PART No.	IRC PART No.	NOTES
R5	150Ω	½	510158	BTS-15K	
R6	47KΩ	½	510167	BTS-47K	
R7	2200Ω	½	510143	BTS-2200	
R8	1000Ω	½	510137	BTS-1000	
R9	4700Ω	½	510148	BTS-4700	
R10	220KΩ	½	510179	BTS-220K	
R11	15KΩ	½	510158	BTS-15K	
R12	10KΩ	½	510154	BTS-10K	
R13	15KΩ	½	510158	BTS-15K	
R14	100Ω	½	510118	BTS-100	
R15	390Ω	½	510129	BTS-390	
R16	1.5 Meg	½	510752	BTS-1.5 Meg	
R17	8200Ω	½	510152	BTS-8200	
R18	47Ω	½	510113	BTS-47	
R19	470Ω	½	510130	BTS-470	
R20	100KΩ	½	510172	BTS-100K	
R21	120KΩ	½	510174	BTS-120K	
R22	6800Ω	½	510151	BTS-6800	
R23	18KΩ	½	510159	BTS-18K	
R24	82Ω	½	510117	BTS-82	
R25	100Ω	½	510118	BTS-100	
R26	4700Ω	½	510148	BTS-4700	
R27	82Ω	½	510117	BTS-82	
R28	100Ω	½	510118	BTS-100	
R29	18KΩ	½	510159	BTS-18K	
R30	8200Ω	½	510153	BTS-8200	
R31	1 Meg	½	510190	BTS-1 Meg	
R32	2700Ω	½	510144	BTS-2700	
R33	22KΩ	½	510160	BTS-22K	
R34	220KΩ	½	510178	BTS-220K	
R35	6800Ω	1	510251	BTA-6800	
R36	680KΩ	½	510187	BTS-680K	
R37	1.5 Meg	½	510753	BTS-1.5 Meg	Note 4
R38	220KΩ	½	510178	BTS-220K	
R39	100KΩ	½	510172	BTS-100K	Note 3
R40	82Ω	½	510117	BTS-82	Note 1
R41	4700Ω	1	510248	BTA-4700	Note 2
R42	220Ω	½	510124	BTS-220	
R43	18KΩ	½	510159	BTS-18K	
R44	220Ω	½	510124	BTS-220	
R45	220KΩ	½	510178	BTS-220K	
R46	22KΩ	½	510160	BTS-22K	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Stewart-Warner PART No.	IRC PART No.	NOTES
R47	10 Meg	½	510197	BTS-10 Meg	
R48	470KΩ	½	510184	BTS-470K	
R49	820KΩ 5%	½	510747	BTS-820K 5%	
R50	560KΩ 5%	½	510778	BTS-560K 5%	
R51	18KΩ	½	510159	BTS-18K	
R52	2.2Meg	½	510193	BTS-2.2Meg	
R53	470KΩ	½	510184	BTS-470K	
R54	2700Ω	1	510244	BTA-2700	
R55	2300Ω	1	510243	BTA-2300	
R56	1800Ω	1	510241	BTA-1800	
R57	27KΩ	½	510162	BTS-27K	
R58A	22KΩ	½	⊕508062	BTS-22K	
B	8300Ω	½		BTS-8200	
C	8200Ω	½		BTS-8200	
R59	1.5Meg 5%	½	510767	BTS-1.5Meg 5%	
R60	1.2 Meg	½	510738	BTS-1.2Meg	
R61	1 Meg	½	510190	BTS-1 Meg	
R62	10KΩ	½	510154	BTA-10K	
R63	68KΩ	½	510169	BTS-68K	
R64	2.2Meg	½	510193	BTS-2.2Meg	
R65	390Ω	½	510129	BTS-390	
R66	560Ω	½	510132	BTS-560	
R67	560Ω	½	510132	BTS-560	
R68	330KΩ	½	510181	BTS-330K	
R69	820KΩ	½	510189	BTS-820K	
R70	100KΩ	½	510172	BTS-100K	
R71	330KΩ	½	510181	BTS-330K	
R72	4700Ω	½	510148	BTS-4700	
R73	220KΩ	½	510178	BTS-220K	
R74	68KΩ	½	510169	BTS-68K	
R75	120KΩ	½	510174	BTS-120K	
R76	150KΩ	½	510175	BTS-150K	
R77	10KΩ	½	510154	BTS-10K	
R78	68KΩ	½	510269	BTA-68K	
R79	470KΩ	½	510184	BTS-470K	
R80	12KΩ	2	510356	BTB-12K	
R81	3.3Ω	½	510725		
R82	1 Meg	½	510190		
R83	600Ω	10	510741	1 3/4A-600	
R84	400Ω	10	510779	1 3/4A-400	
R85	150KΩ	½	510175	BTS-150K	

⊕ Items R58A, R58B, R58C, C55A, C55B, C55C, C55D are combined in one unit.
Note 1. This resistor changed to 120Ω when letter "A" is included in series designation.
Note 2. This resistor changed to 1000Ω when letter "A" is included in series designation.
Note 3. Used only when letter "A" is included in series designation.
Note 4. Not used in all models.

TRANSFORMER (POWER)

ITEM No	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	REPLACEMENT DATA: Stewart-Warner PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC ② 1.44A	650VCT .190ADC	5VAC ③ 3A	522339		P-3073①②				26R24 ①
	SEC. 3	SEC. 4	SEC. 5							
	6.3VAC ④ 1.2A	6.3VAC ④ 6.8A								

① Drill new mounting holes.
② Tape red-black leads.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA: Stewart-Warner PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T2	Vert. Osc. Trans.	520980	A-8125	A-3003	A-97X	209T1①	B6702	TV-24A87 ③
T3	Horiz. Output Trans.	522342	A-8132 * ②	HVO-9 * ③	D-18 * ①	230T1 *②	FB413 *②	FLY-12 * ③
T4	Vert. Output Trans.	522344	A-8123	A-3057	A-102X	222T1	Z1804	T-26352
T5A	Yoke-Horiz.(13.5MH)	522350④	DY-9A ⑤	MDF-73⑥	Y-17-1⑥	211D2⑥	DF602⑤	Y-7⑥
	Yoke-Vert. (35MH)	521267 ⑤						

① Drill one new mounting hole.
② Use original mounting bracket.
③ Drill new mounting holes.
④ Complete with leads, capacitor C79, resistors R66 and R87.
⑤ Yoke cover and positioning device.
⑥ Use original yoke cover and positioning device.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

	ORIGINAL TERMINAL CONNECTIONS	Stancor Replacement Connections	Merit Replacement Connections	Triad Replacement Connections	RCA Replacement Connections	Halldorson Replacement Connections	Thordarson Replacement Connections
	8	8	Hi-Volt Rect Plate Lead	Hi-Volt Rect Plate Lead	Hi-Volt Rect Plate Lead	8	Hi-Volt Rect Plate Lead
	7	7	9	9	9	7	9
	6	5 & 6	7	7 & 8	7	5 & 6	7 & 8
	5	4	5	5	5	4	5
	3	3	T or 4	T or 4	T or 4	3	4
	2	1	3	3	3	1	3
	1 (NC)	NC	NC	NC	NC	NC	NC
Special Notes →		⑦		⑦			

⑦ If insufficient width, connect a .005MMF, 600V capacitor across terminals "T" and #3.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: Stewart-Warner PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T6	4.3KΩ	3.4Ω	509376	A-3877	A-2930	S-5X	Z1001	26S46	

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	REPLACEMENT DATA: Stewart-Warner PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	4"	PM	3.4Ω	521664	ST-113 Mod P4-X	4A1	

COILS (RF-IF)

ITEM No.	USE	DC RES.: PRI.	DC RES.: SEC.	REPLACEMENT DATA: Stewart-Warner PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1A	Ant.Coil	0Ω CT	0Ω	522482				Channel 2
B	Ant.Coil	0Ω CT	0Ω	522483				Channel 3
C	Ant. Coil	0Ω CT	0Ω	522484				Channel 4
D	Ant. Coil	0Ω CT	0Ω	522485				Channel 5
E	Ant. Coil	0Ω CT	0Ω	522486				Channel 6
F	Ant. Coil	0Ω CT	0Ω	522487				Channel 7
G	Ant. Coil	0Ω CT	0Ω	522488				Channel 8
H	Ant. Coil	0Ω CT	0Ω	522489				Channel 9
I	Ant. Coil	0Ω CT	0Ω	522490				Channel 10
J	Ant. Coil	0Ω CT	0Ω	522491				Channel 11
K	Ant. Coil	0Ω CT	0Ω	522492				Channel 12
L	Ant. Coil	0Ω CT	0Ω	522493				Channel 13
L2	Fil. Choke	0Ω		510518				
L3A	RF, Mixer Grid & Osc. Coils	0Ω		522502				Channel 2
B	RF, Mixer Grid & Osc. Coils	0Ω		522503				Channel 3
C	RF, Mixer Grid & Osc. Coils	0Ω		522504				Channel 4
D	RF, Mixer Grid & Osc. Coils	0Ω		522505				Channel 5
E	RF, Mixer Grid & Osc. Coils	0Ω		522506				Channel 6
F	RF, Mixer Grid & Osc. Coils	0Ω		522507				Channel 7
G	RF, Mixer Grid & Osc. Coils	0Ω		522508				Channel 8
H	RF, Mixer Grid & Osc. Coils	0Ω		522509				Channel 9
I	RF, Mixer Grid & Osc. Coils	0Ω		522510				Channel 10
J	RF, Mixer Grid & Osc. Coils	0Ω		522511				Channel 11
K	RF, Mixer Grid & Osc. Coils	0Ω		522512				Channel 12

STEWART-WARNER
MODEL 17T-9380A

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: Stewart-Warner PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L	RF, Mixer Grid & Osc. Coils	0Ω		522513				Channel 13
L4	Fil. Choke	0Ω		520520				
L5	RF Choke	0Ω		521835				
L6	1st. Video IF	1Ω		520734				Includes core, core part #509062
L7	2nd. Video IF	.2Ω		507343	17-1004	TV-103 †	6189 †	Less slug, slug part #507357
L8	RF Choke	2.5Ω		507367	19-6022		4626	20 Microhenries
L9	3rd. Video IF	.2Ω		507343	17-1003	TV-102 †	6188 †	Less slug, slug part #507357
L10	4th. Video IF	.2Ω		507343	17-1004	TV-103 †	6189 †	Less slug, slug part #507357
L11	RF Choke	2.3Ω		507367	19-6022		4626	20 Microhenries
L12	Series Peaking Coil	8.5Ω		520620	19-3180	TV-184	6180	150 Microhenries
L13	Shunt Peaking Coil	20Ω		520985	19-3660		4650	560 Microhenries
L14	4.5MC Trap	2Ω		509603	20-1004	TV-151	1470	Includes slug & C39, slug part #507357
L15	Series Peaking Coil	11Ω		520689	19-3180	TV-184	6180	195 Microhenries
L16	Shunt Peaking Coil	16Ω		509342	19-1923	TV-188	4648	400 Microhenries
L17	Sound IF	2Ω		509603	17-3400	TV-151	1469	Includes slug & C42, slug part #507357
L18	Ratio Det.	4.2Ω	.9Ω CT	509706	17-3493	TV-115 ■	1498	Tertiary winding - .45Ω
L19	Horiz. Osc.	90Ω		520943	20-1402 *	TV-162 *	6183 *	Includes slug, slug part #521064, primary winding tapped @ 65Ω, horiz. waveform winding-48Ω.

† Enlarge mounting hole.
■ Use adaptor plate
* Reverse coil mounting in can.

FILTER CHOKE

ITEM No.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D. C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA: Stewart-Warner PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L20	.190A	106Ω	2.9HY	522343	C-2325 ①		C-21X	C5040 ①	20C49

① Drill one new mounting hole.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA: Stewart-Warner PART No. FUSE	Stewart-Warner PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG P/T	1/4A 250V	508063		318.250 (3AG P/T 1/4A)		GJV 1/4	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA: Stewart-Warner PART No.	SYLVANIA PART No.	FEDERAL PART No.	NOTES
M2	1N64	509386	1N132	1N64A	Video Detector

MISCELLANEOUS

ITEM No.	PART NAME	Stewart-Warner PART No.	NOTES
M3	Tuner	522347	
M4	Ion Trap	521183	
M5	Centering Magnet	521267	Includes yoke cover
	Cabinet	522281	
	Knob	522354	Channel selector
	Knob	509017	Fine tuning
	Knob	509018	Off/on Volume
	Knob	509019	Contrast
	Safety Glass	522272	

TROUBLE SHOOTING AIDS (cont)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly. Check switch on volume control and T1. If filaments light, substitute V17. Check B+ filter and decoupling network for failure or change of value.

SMALL AND/OR DIM PIX

Substitute V17. Check B+ filter and decoupling network components.

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V13, V14, V15, V16 and V17. Check M1 fuse. Check waveform W13.

If Satisfactory	If Unsatisfactory
Check T3, T5A, C76, C77, R80 and other associated circuit.	Check C73, C72, L19, R79, R78, R77, R74, R75 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V13, V14, V15 and V17. Check picture tube. Proceed as outlined under "Loss of High Voltage".

BLOOMING

Check by substitution V14, V16 and V17. Check R80, C74, and other associated components.

GENERAL

RASTER SOUND NO PIX

Follow procedure outlined under "Loss of Video".

RASTER PICTURE NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER NO SOUND NO PIX

Check by substitution V3, V4, V5 and V6. Check V1 and V2 in tuner, video IF and video components.

NO RASTER NO SOUND

Follow procedure outlined under "Dead Set".

KEYSTONE EFFECT

Check T5, C76 and C77.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at time, thru the small hole in the cabinet to the right of the channel selector shaft.

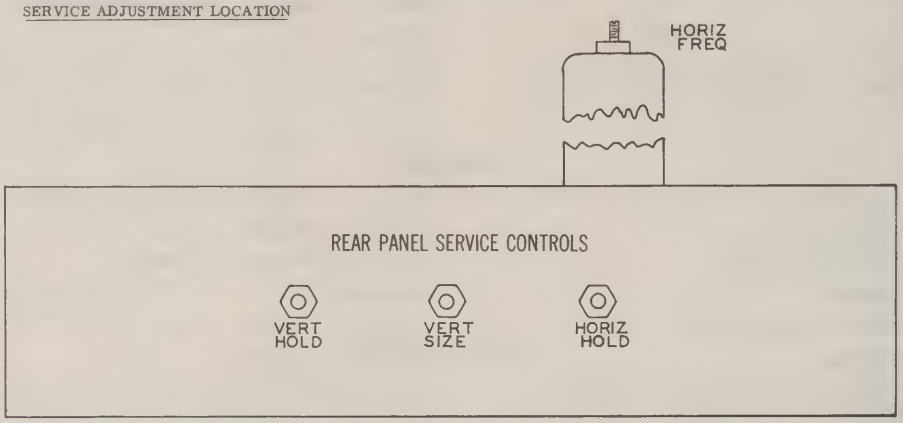
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove three (3) wood screws holding metal strip at the top front of the cabinet. Remove metal strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the rear panel of the chassis. Set the horizontal hold control at the mid-position of its range and adjust the horizontal frequency slug (L19) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L18) located on top of chassis. (See tube placement chart).

FUSES

One fuse is used for horizontal sweep circuit protection. (For location see tube placement chart).

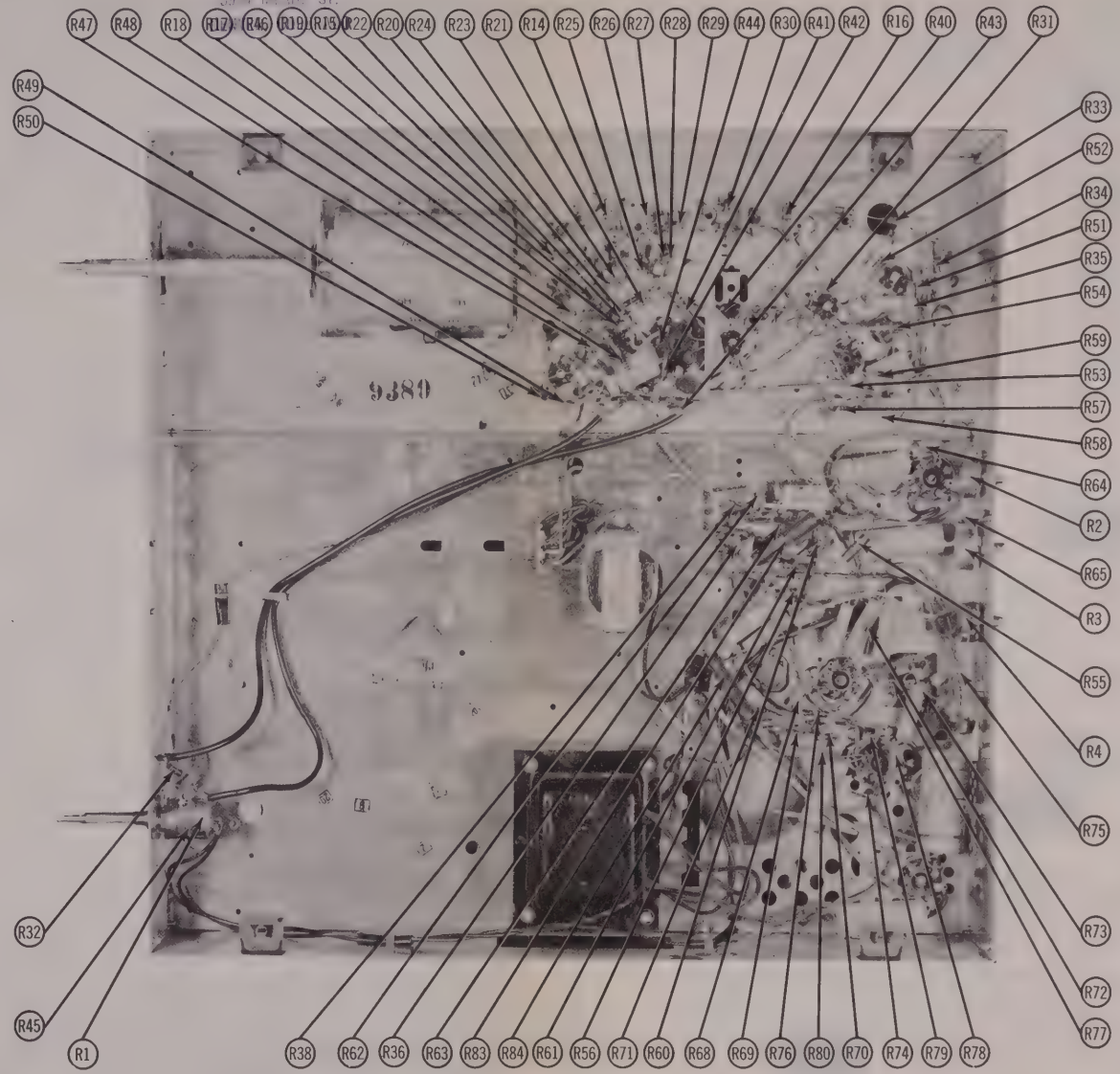
CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

1. Remove 4 push on type control knobs from front panel.
2. Remove 1 metal screw. Remove rear cover.
3. Remove 2 wood screws. Remove transmission line from rear of cabinet.
4. Disconnect speaker leads.
5. Remove 4 chassis bolts. Remove chassis.
6. Remove 2 speaker nuts. Remove speaker.

PROPERTY OF
L. E. F. ANKENSHIP
33[illegible] ST.



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

STEWART-WARNER
MODELS 9181A, C, D, E, F

STEWART-WARNER
MODELS 9181A, C, D, E, F

TRADE NAME	Stewart-Warner Models 9181A, C, D, E, F
MANUFACTURER	Stewart-Warner Electric, Div. of Stewart-Warner Corp., 1300 N. Kostner Ave., Chicago 15, Ill.
TYPE SET	AC-DC Operated 2 Band AM Superheterodyne Receiver
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12AT6 Det.-AVC-AF Amp., 50C5 Audio Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC/DC
RATING	.27 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535-1650KC
SHORT WAVE	1.8 to 3MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	200MMF	High side to antenna stator lug on tuning gang. Low side to B-.	455KC (400%Mod)	BC	Tuning gang fully open	Across voice coil	A1, A2 A3, A4	Adjust for maximum output.
2.	"	High side to external antenna lead. Low side to B-.	1650KC	"	"	"	A5	"
3.	"	"	600KC	"	Tune to 600KC signal	"	A6	Adjust for maximum output. Repeat step 2.
4.	"	"	1500KC	"	Tune to 1500KC signal	"	A7	Adjust for maximum output.
5.	"	"	3MC	SW	Tune to 3MC signal	"	A8	"
6.	"	"	1.8MC	"	Tune to 1.8MC signal	"		Check to see that 1.8MC signal can be received.

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1954 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

STEWART-WARNER
MODEL 9181A

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: Stewart-Warner PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amplifier	12BA6	12BA6	7BK	
V3	Det.-AVC-AF Amp	12AT6	12AT6	7BT	
V4	Audio Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Stewart-Warner PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	50	150	520598	PRS150/50-30		BBRD5315		TCD497	TVA-2450	Red
B	30	150								
C2	.02	400	512208	P488-02		CUB4S2		PT412	4TM-S2	
C3	.02	400	512208	P488-02		CUB4S2		PT412	4TM-S2	
C4	944	500	512548							
C5	47		513002	SI47	D6-470	TP29	GP1K-470	UC-5447	5GA-Q47	
C6	5		513401							
C7A	220		♦509836	♦PA-113-2	♦PC-151	♦1116TM2	♦1408-02		♦DT-2	
B	2000									
C	5000									
D	250									
F										
C8	.02	400	512208	P488-02		CUB4S2		PT412	4TM-S2	
C9	.05	400	512209	489ZX-05	DF-503	CUB4S5		PT415	4TM-S5	
C10	.15	400	512041	P488-15		CUB4P15		PT4015	4TM-P15	

♦ Items C7A, C7B, C7C, C7D, C7E, R6A, R6B and C6C are combined in one unit.
When replacing items separately C7D and C7E should total 250MMF.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: Stewart-Warner PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1 Meg	½	521630	Q13-137	A47-1Meg-Z	BSK-70-S	U-53	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWE-12	Not Req.	US-26	Attach to R1A

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Stewart-Warner PART No.	IRC PART No.	NOTES
R2	22KΩ	½	510161	BTS-22K	
R3	100Ω	½	510119	BTS-100	
R4	100KΩ	½	510173	BTS-100K	
R5	2.2Meg	½	510193	BTS-2.2Meg	

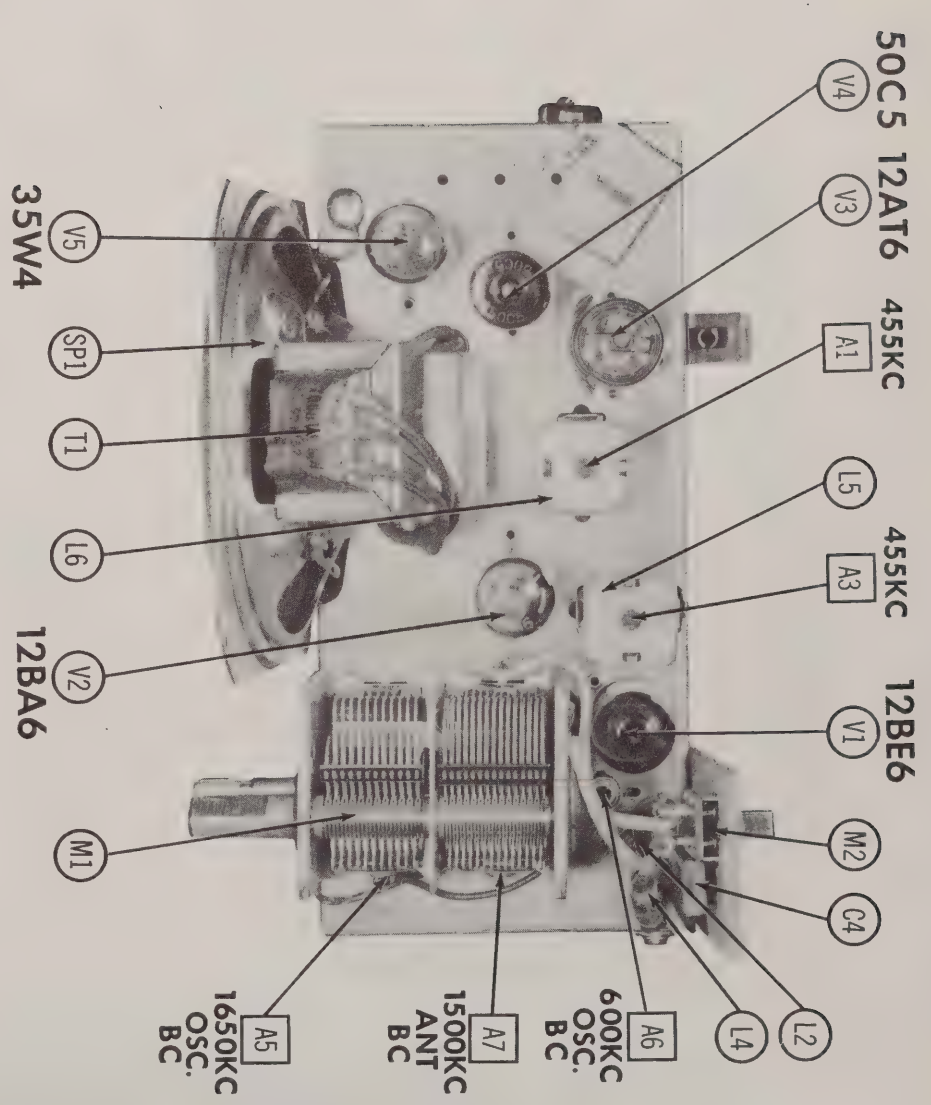
ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Stewart-Warner PART No.	IRC PART No.	NOTES
R6A	6.8Meg	½	♦509836	BTS-6.8Meg	
B	470KΩ	½		BTS-470K	
C	470KΩ	½		BTS-470K	
R7	150Ω	½	510122	BTS-150	
R8	1000Ω	1	510237	BTA-1000	

♦ Items R6A, R6B, R6C, C7A, C7B, C7C, C7D, C7E are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: Stewart-Warner PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	2.4KΩ	3.1Ω	522152 ① 522151 ②						① Rivet mounting. ② Clinch mounting.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	Stewart-Warner PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.1Ω	521633	ST-113 Mod P4-X	4A07	

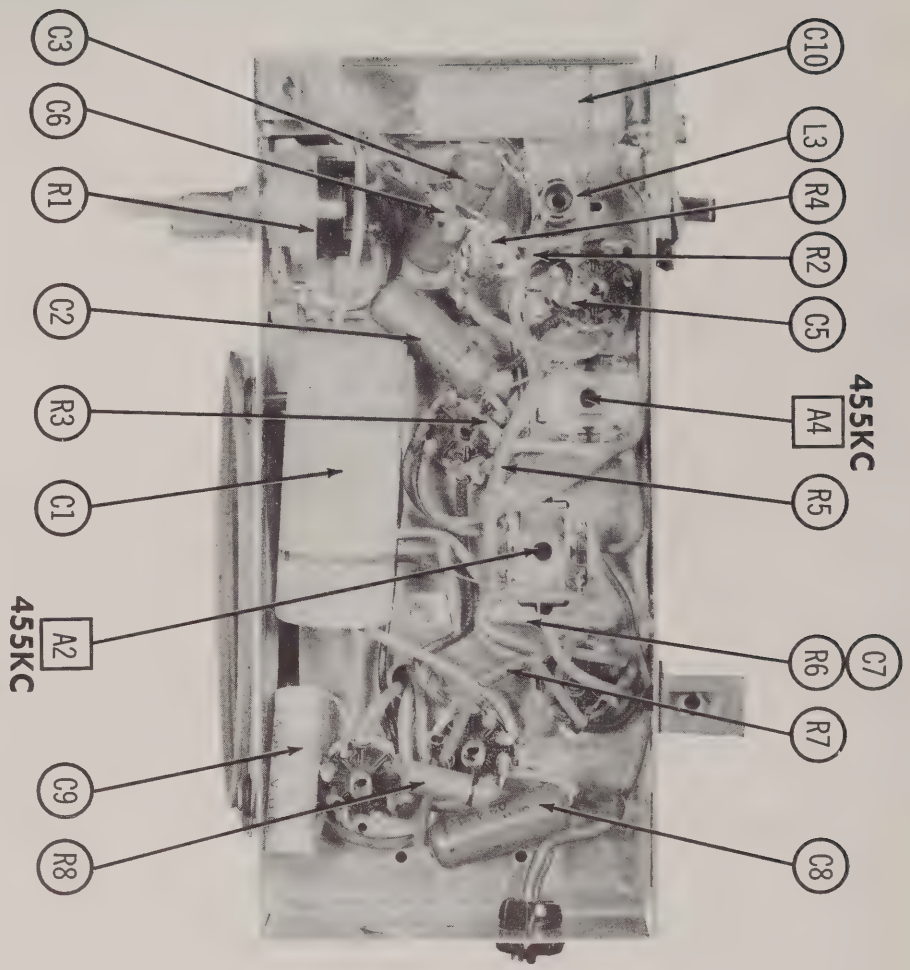
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	Stewart-Warner PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	BC Loop Ant.	2.1Ω		521767				Includes cabinet back
L2	SW Ant. Coil	1.7Ω		521659	19-6022		4626	
L3	BC Osc. Coil	.7Ω	6.5Ω	521756	14-1074	BC-381	71-Osc.	
L4	SW Osc. Coil	3Ω		521754	19-3036	TV-180	6176	
L5	Input IF	17Ω	17Ω	509433	16-6758	BC-352	12-C1	
L6	Output IF	17Ω	17Ω	509433	16-6758	BC-353	12-C2	

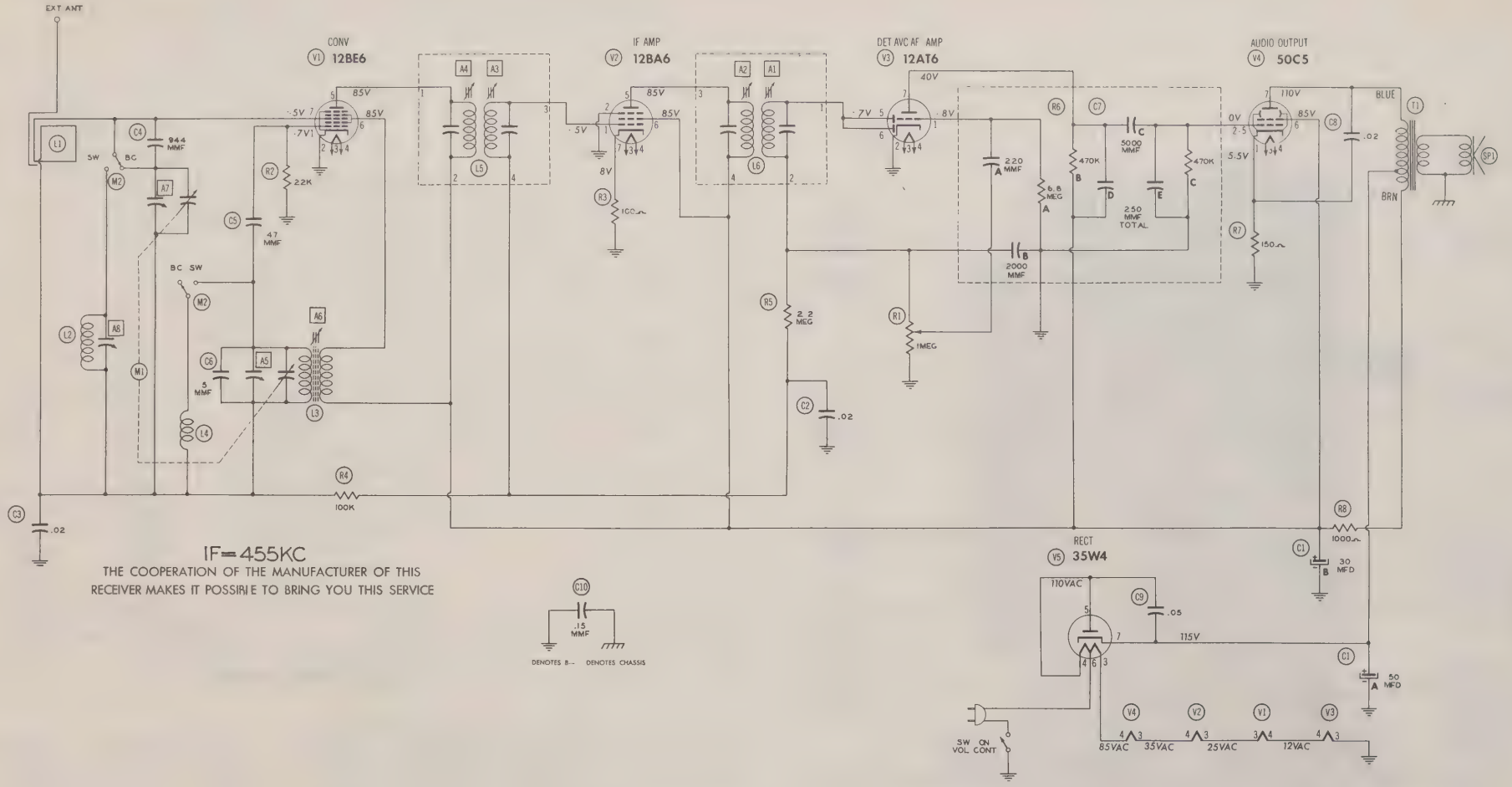
MISCELLANEOUS

ITEM No.	PART NAME	Stewart-Warner PART No.	NOTES
M1	Tuning cap	521628	(44-507MMF) (22-170MMF)
M2	Switch	521655	Function
A8	Trimmer cap	521766	4-70MMF
	Cabinet	521660	Mahogany Model 9181-A
	Cabinet	521709	Gray Model 9181-C
	Cabinet	521712	Maroon Model 9181-D
	Cabinet	521717	Yellow Model 9181-E
	Cabinet	521718	Blue-Model 9181-F
	Knob	521698	Volume-tan 81-A or D
	Knob	521699	Volume-red 9181-C
	Knob	521701	Volume-green 9181-E
	Knob	521702	Volume-blue 9181-F
	Knob	521703	Tuning-tan
	Knob	521704	Tuning-red
	Knob	521706	Tuning-green
	Knob	521707	Tuning-blue

CHASSIS—BOTTOM VIEW



STEWART-WARNER MODEL 9181A



IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

DENOTES B+ — DENOTES CHASSIS

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	0Ω	25Ω	12Ω	†1KΩ	†1KΩ	3.3Meg
V 2	12BA6	3.2Meg	0Ω	25Ω	36Ω	†1KΩ	†1KΩ	100Ω
V 3	12AT6	6.8Meg	0Ω	0Ω	12Ω	1Meg	1Meg	†470KΩ
V 4	50C5	150Ω	470KΩ	36Ω	88Ω	470KΩ	†1KΩ	†220Ω
V 5	35W4	†9Ω	0Ω	88Ω	125Ω	125Ω	115Ω	200KΩ

† MEASURED FROM PIN 7 OF V5

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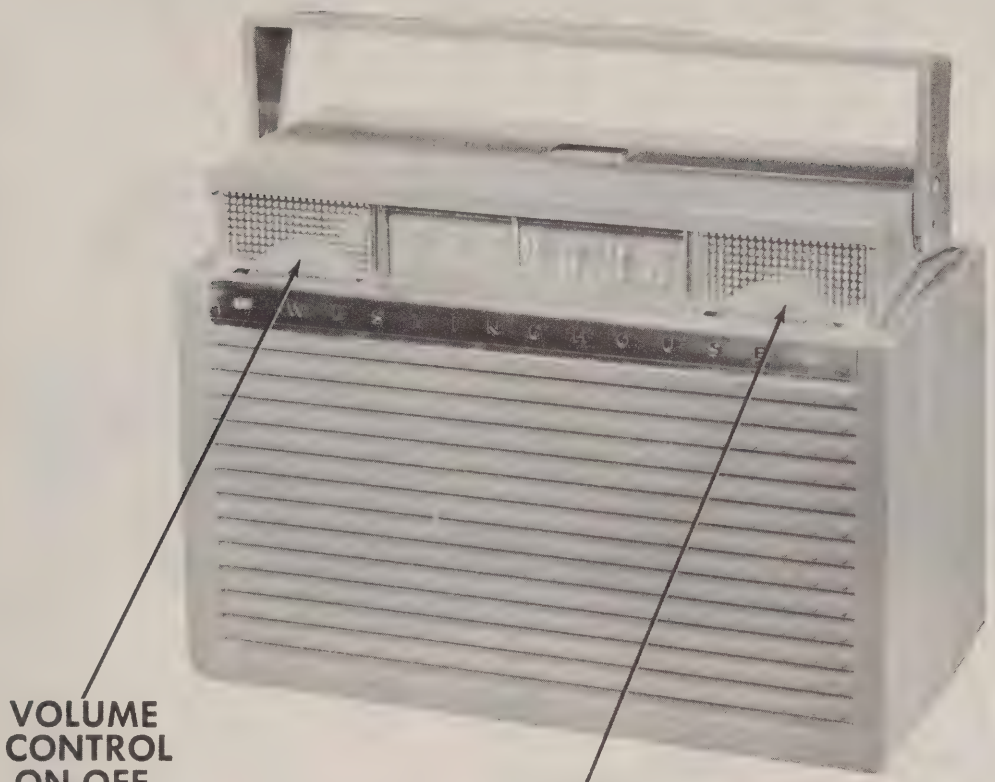
WESTINGHOUSE MODELS H-422P4, H-423P4, H424P4, H425P4 (Ch. V-2188-1)



WESTINGHOUSE MODELS H-422P4, H-423P4, H424P4, H425P4 (Ch. V-2188-1)

TRADE NAME	Westinghouse Models H-422P4, H-423P4, H-424P4, H-425P4 (Ch. V-2188-1)
MANUFACTURER	Westinghouse Electric Corp., TV-Radio Div., Metuchen, N.J.
TYPE SET	Three Power Portable Superheterodyne Receiver
TUBES (Four)	Types 1R5 Conv., 1U4 IF Amp., 1U5 Det.-AVC-AF Amp., 3V4 Audio Output
POWER SUPPLY	110-120 Volts AC-DC (or) 3 Volts "A" Supply & 75 Volts "B" Supply
RATING	.13 Amp. @ 117 Volts AC (or) 150MA @ 3 Volts DC & 8MA@ 75 Volts DC
TUNING RANGE--BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.
Use battery power, if possible. If AC power is used, use an isolation transformer when available. If not, connect a .1MFD capacitor in series with low side of the signal generator and B-.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to antenna stator lug on tuning gang. Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If AC power is used without an isolation transformer, reduce dummy antenna to 200MMF to reduce hum modulation.
2.		Loop	1625KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	"	"	A6	"

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PARTS LIST AND DESCRIPTIONS

WESTINGHOUSE
MODEL H-422P4, (Ch. V-2188-1)

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: Westinghouse PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	Converter	1R5	1R5	7AT	
V2	IF Amplifier	1U4	1U4	6AR	
V3	Det.-AVC-AF Amp	1U5	1U5	6BW	
V4	Audio Output	3V4	3V4	6BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Westinghouse PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲60	150	V-6552-2	E4D250					R1105	
B	■40	150								
C	▲80	150								
D	100	25								
C2	.05	200	RCP10W2503M	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C3	5000		R2CC62Z502P	BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C4	2000		R2CC6125Z202P	BPD-002	DD-202	K072	802-002	DC-522	5HK-D2	
C5A	150				D6-151	G046	GP1K-151	UC-5315		
B	2000				DD-202	K080	801-002	DC-522		
C	100		♦V-9703-1	♦PA-102	D6-101	G042	GP1K-101	UC-531	♦34C4	
D	5000				DD-502	K082	801-005	DC-525		
E	5000				DD-502	K082	801-005	DC-525		
C6	2000		R2CC6125Z202P	BPD-002	DD-202	K072	801-002	DC-522	5HK-D2	
C7	.047	400	V-10157-4437M	489ZX-047	DF-503	CUB4S47		PT4147	4TM-S47	
C8	.05	200	RCP10W2503M	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C9	.05	200	RCP10W4503M	P288-05	DF-503	PJ2S5		PT415	2TM-S5	

♦ Items C5A, C5B, C5C, C5D and C5E are combined in one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: Westinghouse PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	500KΩ	½	V-11129D-2			B-60-S		Volume & switch - Note

Note. Some models may use an alternate Part No. V-112292.

RESISTORS

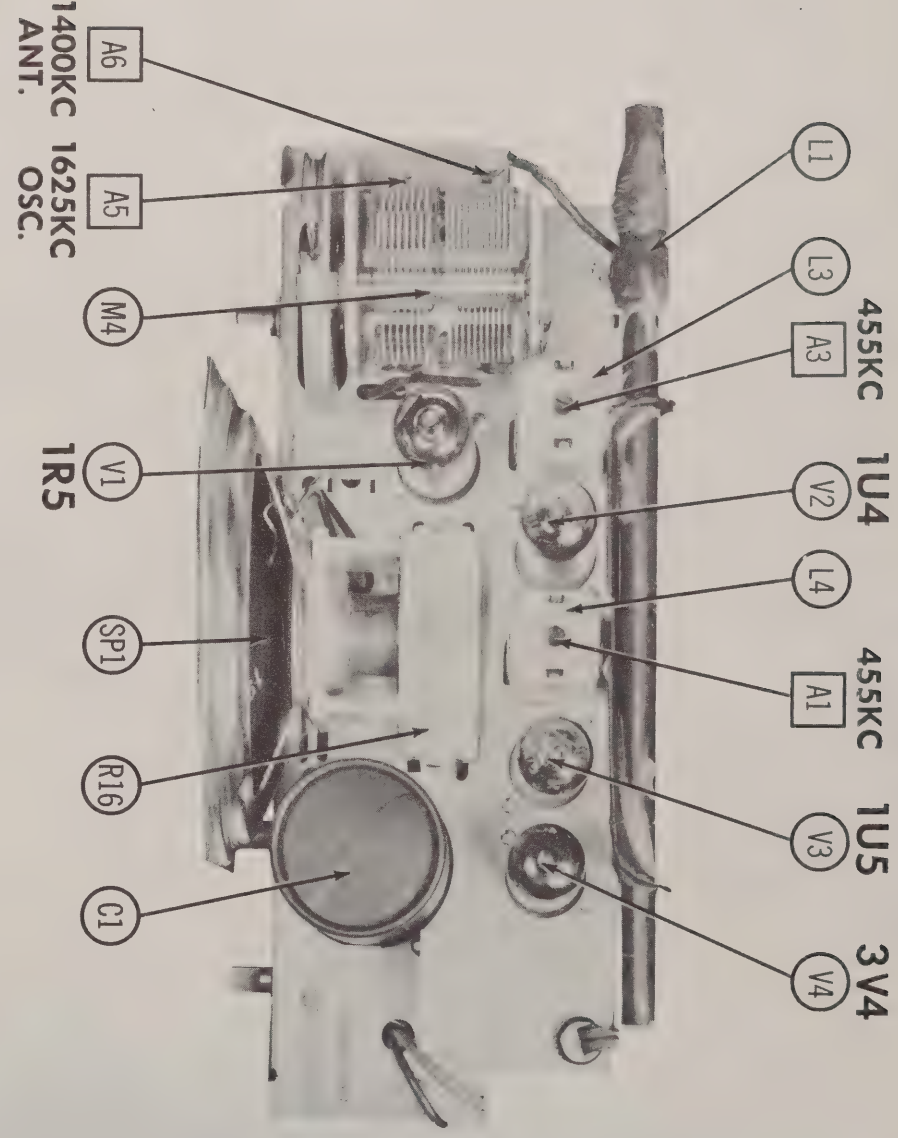
ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Westinghouse PART No.	IRC PART No.	NOTES
R2	100KΩ	½	RC20AE104M	BTS-100K	
R3	22KΩ	½	RC20AE223M	BTS-22K	
R4	4.7Meg	½	RC20AE475M	BTS-4.7Meg	
R5	3.3Meg	½	RC20AE335M	BTS-3.3Meg	
R6	47KΩ	½	RC20AE473M	BTS-47K	
R7	10Meg	½	RC20AE106M	BTS-10 Meg	
R8	4.7Meg	½	RC20AE475M	BTS-4.7Meg	
R9	1 Meg	½	RC20AE105M	BTS-1 Meg	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Westinghouse PART No.	IRC PART No.	NOTES
R10	2.2 Meg	½	RC20AE225M	BTS-2.2Meg	
R11	560Ω	½	RC20AE561K	BTS-560	
R12	27Ω	½	RC20AE270K	BTS-27	
R13	1500Ω	½	RC20AE152K	BTS-1500	
R14	150Ω	3	V-6067-8		
R15	820Ω	½	RC20AE821K	BTS-820	
R16A	1000Ω	10	V-10435-2		
B	1000Ω	10			

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: Westinghouse PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	9.8KΩ	3.3Ω	V-12531-1		A2927				

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	Westinghouse PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.3Ω	V-11554-2	ST-113 Mod. P4-X	4A07	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	Westinghouse PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	1.2Ω		V-12512-1				Includes bracket
L2	Osc. Coil	2.5Ω	12Ω	V-5661-3	14-1073		69-Osc. †	
L3	Input IF	18Ω	18Ω	V-6972-5	16-6758	BC-352	12-C1	
L4	Output IF	24Ω	23Ω	V-6972-6	16-6758	BC-353	12-C2	

† Drill mounting hole.

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	Westinghouse PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	SELETRON PART No.	
M1	.062A	V-9446-4	1003	RS75	6S75	75	5M4	

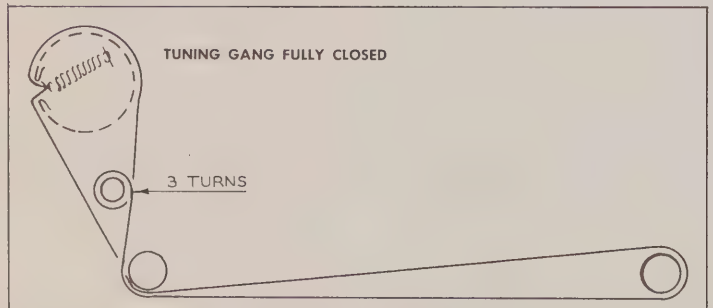
BATTERIES

ITEM No.	VOLTAGE	Westinghouse PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M2	1.5V		964			2IR			2 used in series
M3A	75V			437			XX50		
B	*67.5V			*477			*P45		

* Optional replacement "B" battery - since this battery is smaller, it is suggested to fasten a heavy rubber band between the "A" battery spring contacts, thereby holding the smaller type "B" battery firmly against the bottom of the cabinet.

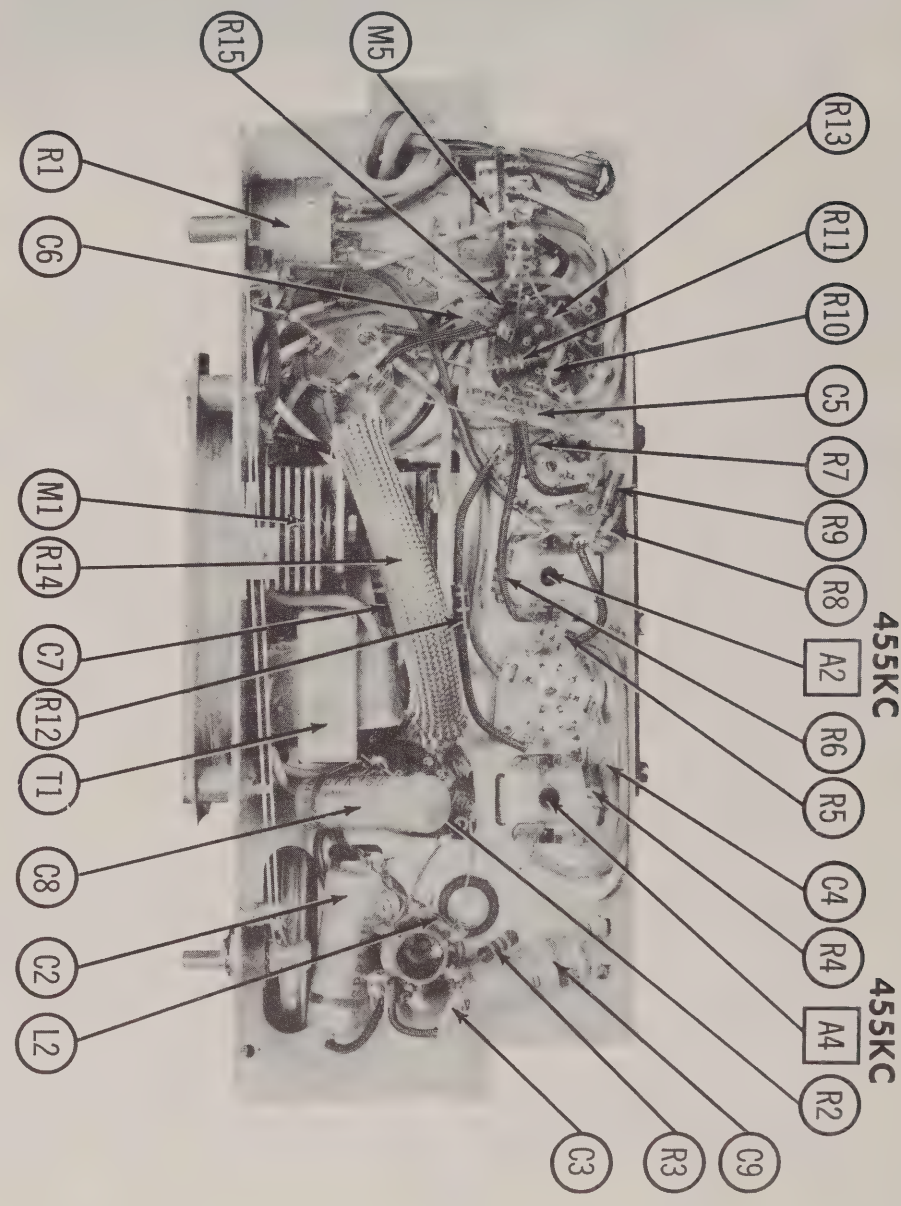
MISCELLANEOUS

ITEM No.	PART NAME	Westinghouse PART No.	NOTES
M4	Tuning cap	V-12523-1	(21-295MMF) (13-105MMF)
M5	Switch	V-10426-3	Power selector
	Cabinet	V-1338-1	Model H-422P4 (includes dial, back cover, escutcheon, and spring) maroon
	Cabinet	V-1338-2	Model H-423P4 (includes dial, back cover, escutcheon, and spring) coral
	Cabinet	V-1338-3	Model H-424P4 (includes dial, back cover, escutcheon, and spring) beige
	Cabinet	V-1338-4	Model H-425P4 (includes dial, back cover, escutcheon, and spring) black
	Cabinet back	V-8716	Model H-422P4- maroon
	Cabinet back	V-8717	Model H-423P4- coral
	Cabinet back	V-8718	Model H-424P4-beige
	Cabinet back	V-8719	Model H-425P4-black
	Knob	V-12492-1	2 used

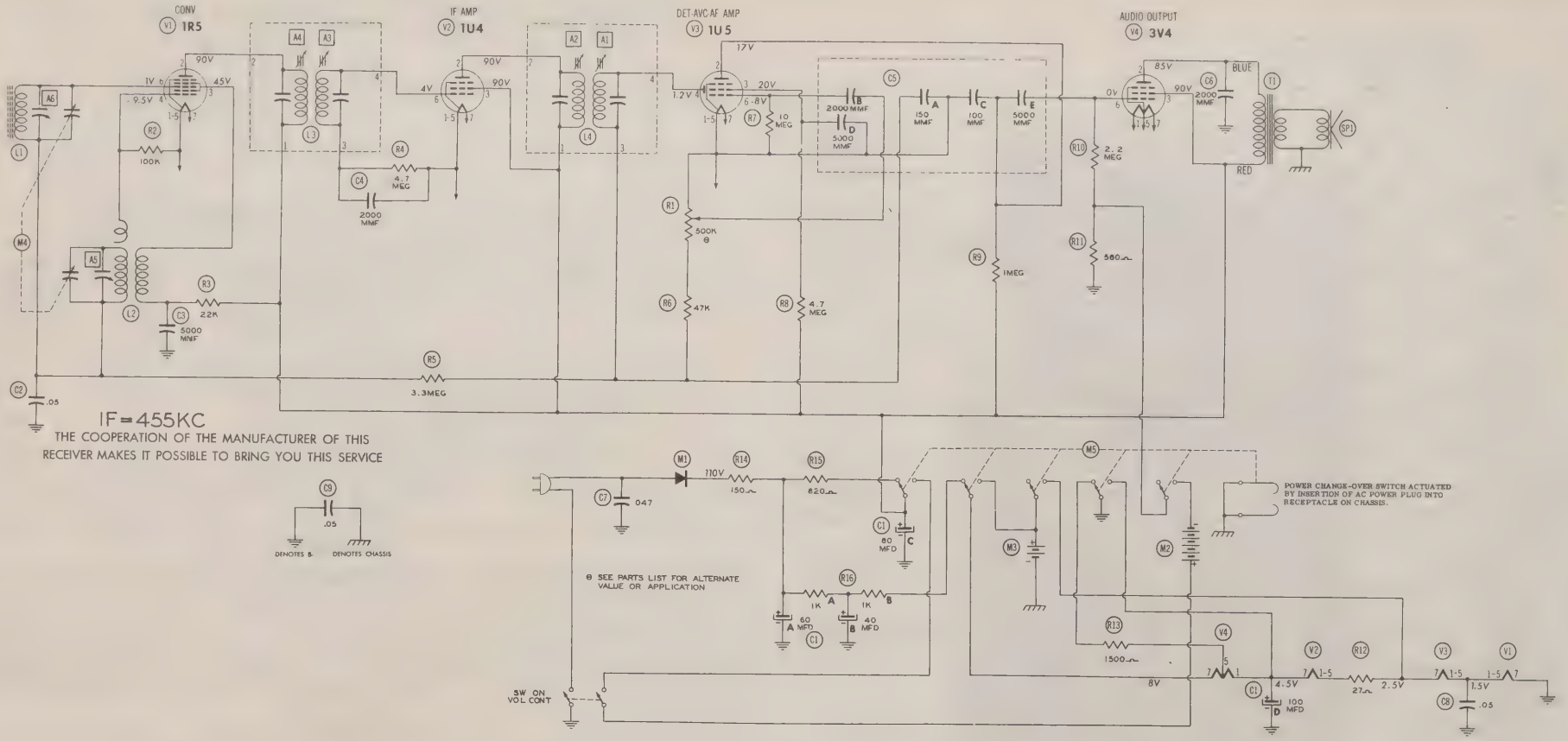


DIAL CORD STRINGING

CHASSIS—BOTTOM VIEW



WESTINGHOUSE
MODEL H-422P4, (Ch. V-2188-1)



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	*	†1KΩ	†23KΩ	100KΩ	*	3.8Meg	*
V 2	1U4	*	†1KΩ	†1KΩ	3.8Meg	*	4.7Meg	*
V 3	1U5	*	†1Meg	†4.7Meg	550KΩ	500KΩ	10Meg	*
V 4	3V4	*	†1.5KΩ	†1KΩ	560Ω	*	2.2Meg	*

* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE
† MEASURED FROM OUTPUT OF M1

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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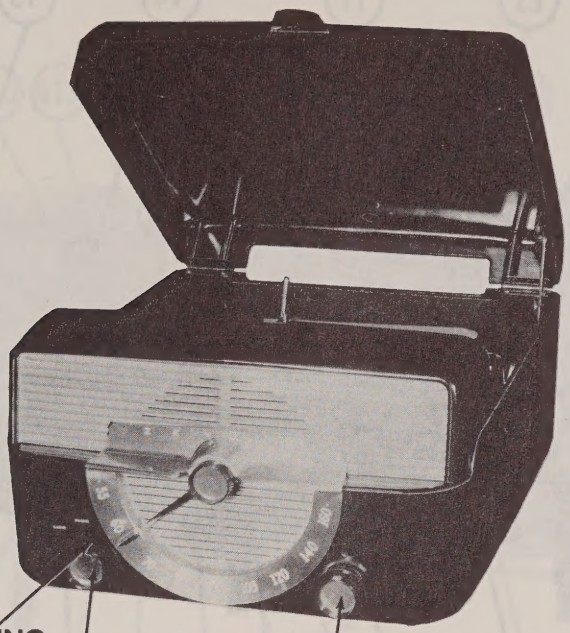
ZENITH
MODEL L566 (Ch. 5L08)



ZENITH
MODEL L566 (Ch. 5L08)

TRADE NAME	Zenith Model L566 (Ch. 5L08)
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago, Ill.
TYPE SET	AC Operated Radio-Phono Combination Superheterodyne Receiver with 3 Speed Automatic Record Changer
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12AT6 Det.-AVC-AF Amp., 50C5 Audio Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles — RATING .25 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer, turn tuning capacitor fully closed and set pointer parallel with base of dial.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use Zenith alignment wrench #68-19 or equivalent.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.5MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1620KC	"	"	A5	Fashion loop of several turns fof wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal	"	A6	"

FOR SERVICE INFORMATION ON RECORD CHANGER UNIT(S-14054)—SEE PHOTOFACT SET #226, FOLDER #13.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		ZENITH PART No.	STANDARD REPLACEMENT		
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amp.	12BA6	12BA6	7BK	
V3	Det. AF Amp.	12AT6	12AT6	7BT	
V4	Audio Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	■80	150	22-2272	AFH3-13		D001		FP216	R1040	
B	▲40	150						TC45		
C	20	150								
C2	.05	200	22-178	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C3	110		22-5	S1110	D6-111	G043	GP1K-111	UC-5311	5GA-T11	
C4	10000		22-3	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C5	10000		22-3	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C6	.05	200	22-178	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C7	10000		22-178	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C8	4000		22-4	BPD-004	DD-402	K078	811-004	DC-524	5HK-D4	
C9	470		22-6	BPD-00047	D6-471	K060	GP2K-471	UC-5347	5GA-T47	
C10	.05	200	22-178	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C11	10000		22-3	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C12	.01	400	22-1182	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C13	10000		22-3	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C14	.01	200	22-826	289ZX-01	D6-103	PJ2S1	GP2-333-103	PT411	2TM-S1	
C15	.05	200	22-178	P288-05	DF-503	PJ2S5		PT415	2TM-S5	

CONTROLS

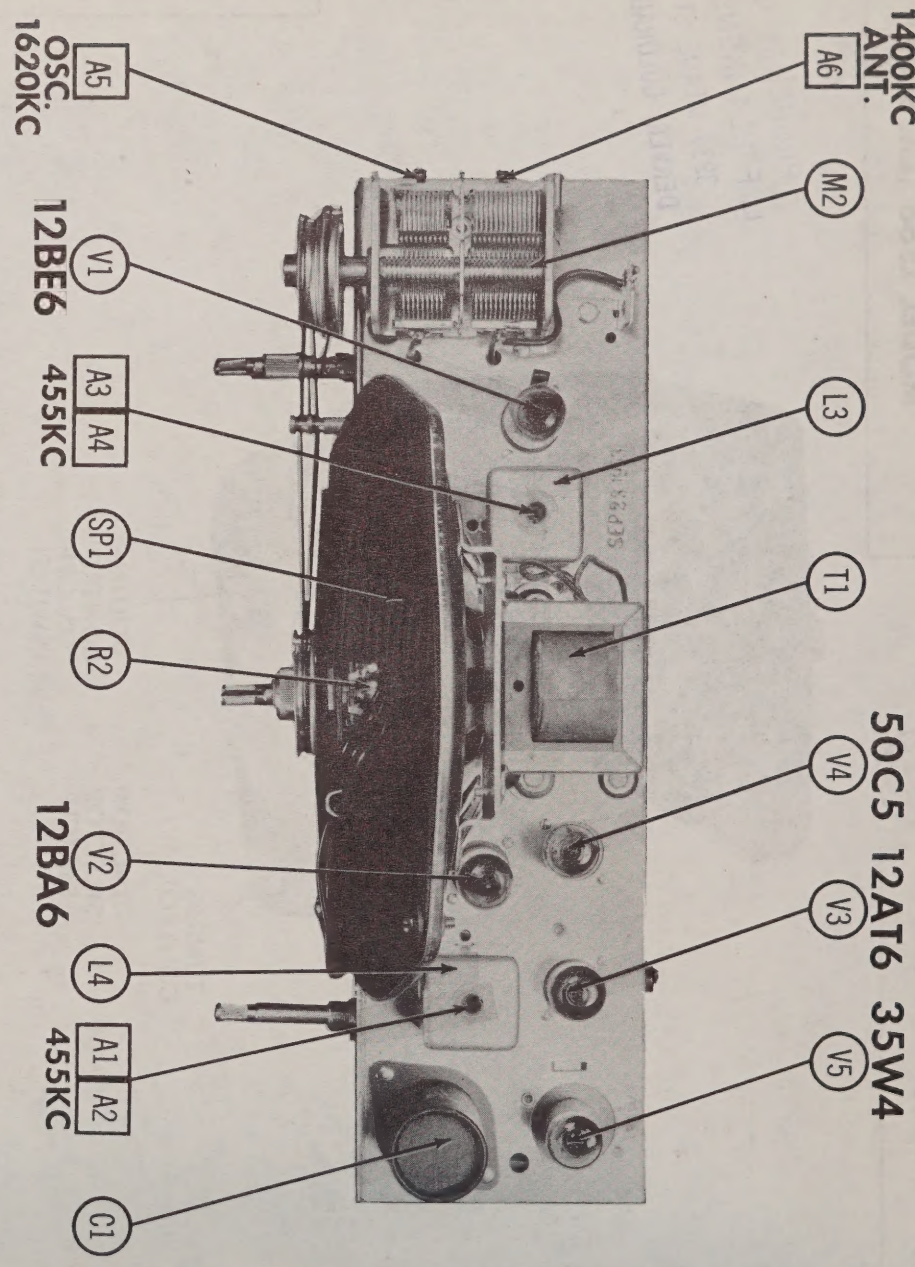
ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ZENITH PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	63-2270	Q11-133	A47-500K-S	AB-59	U-50	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWE-12	KB-1	US-26	Attach to R1A
R2A	500KΩ	½	63-2269		A47-500K-S	AB-59	U-50	Tone
B	Shaft		Not Req.		KSS-3	AK-4	Not Req.	Attach to R2A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ZENITH PART No.	IRC PART No.	
R3	10KΩ	½	63-1828	BTS-10K	
R4	15Meg	½	63-1961	BTS-15 Meg	
R5	3.3Meg	½	63-1933	BTS-3.3Meg	
R6	120Ω	½	63-1747	BTS-120	
R7	4.7Meg	½	63-1940	BTS-4.7Meg	
R8	10KΩ	½	63-1828	BTS-10K	
R9	2.2Meg	½	63-1926	BTS-2.2Meg	
R10	4.7Meg	½	63-1940	BTS-4.7Meg	
R11	470KΩ	½	63-1898	BTS-470K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ZENITH PART No.	IRC PART No.	
R12	820Ω	½	63-1782	BTS-820	
R13	470KΩ	½	63-1898	BTS-470K	
R14	3300Ω	½		BTS-3300	
R15	1500Ω	½	63-1793	BTS-1500	
R16	1000Ω	1	63-1574	BTA-1000	
R17	150Ω	1	63-1977	BTA-150	
R18	22Ω	½	63-1884	BTS-220K	
R19	220KΩ	½	63-1884	BTS-220K	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ZENITH PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T1	2.5KΩ	3.7Ω	206-725	A-3336 ①	A3031 ①		Z1102 ①	TS-24S50A ①	① Drill one new mounting hole.

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	ZENITH PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	3Ω		S-19169				
L2	Osc. Coil	.8Ω	6Ω	S-13799	14-1074	BC-381 †	71-Osc. †	
L3	Input IF	23Ω	24Ω	95-1101	16-6666	BC-368	012-C1	
L4	Output IF	18Ω	18Ω	95-1102	16-6770 *	BC-355 *	12-C5 *	

† Drill mounting hole.
* Use adaptor plate and cut out center spade bolt mounting support.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	ZENITH PART No.	JENSEN PART No.	QUAM PART No.	
SP1	8"	PM	3.7Ω	49-725	ST-115 Mod P8-V	8A21	

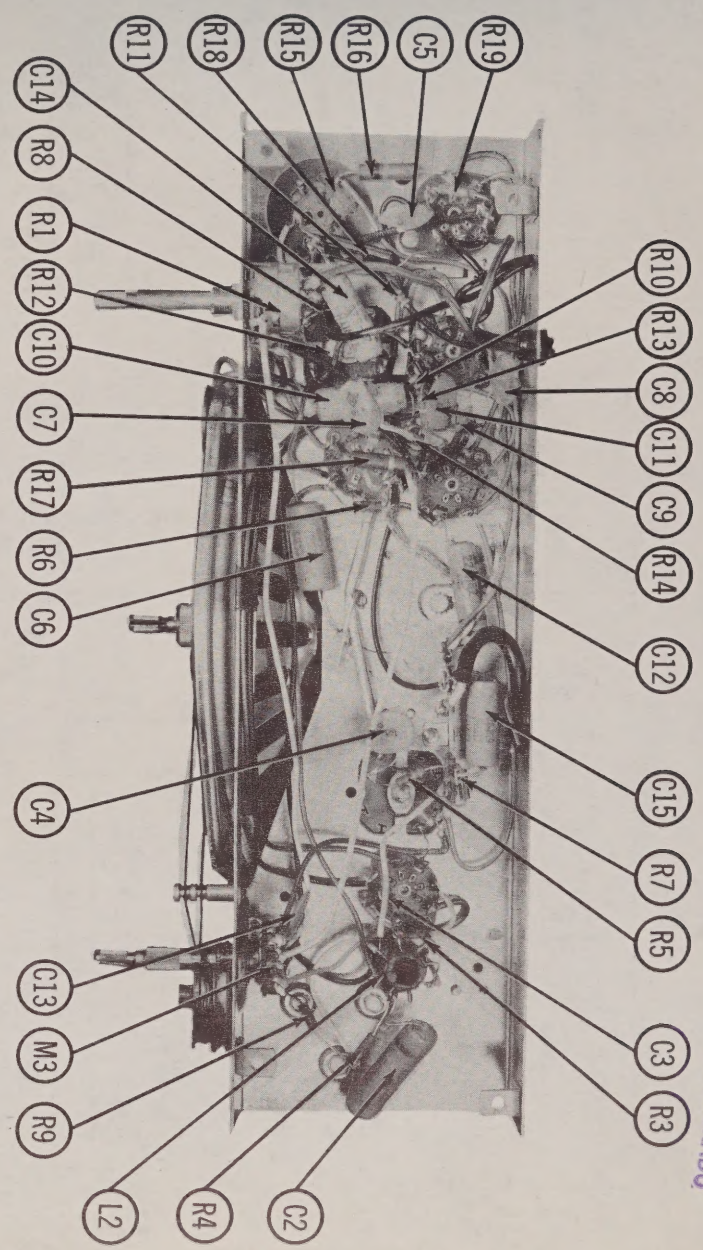
PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA							REMARKS
	ZENITH PART No.	ASTATIC PART No.		SHURE PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1	142-72							

MISCELLANEOUS

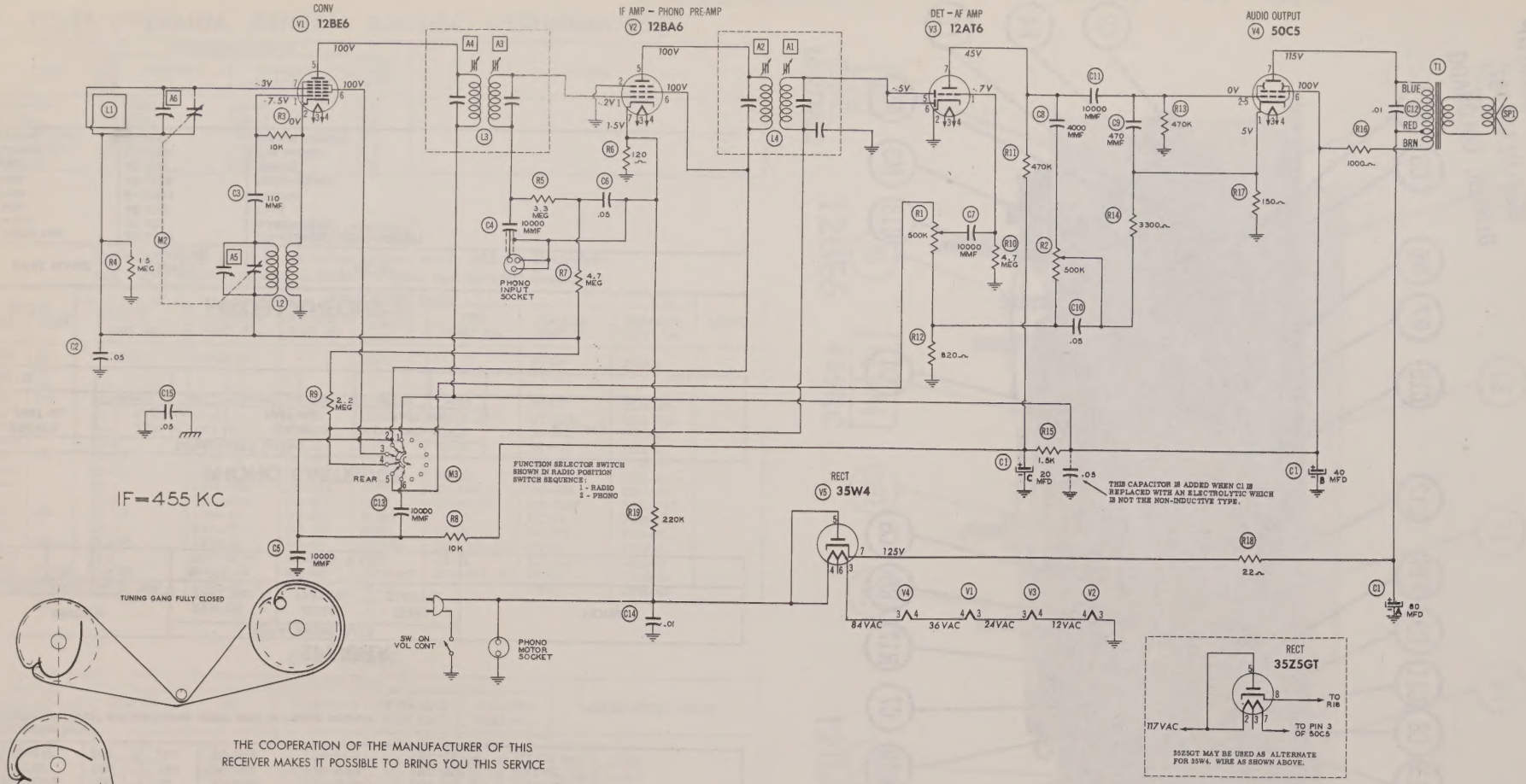
ITEM No.	PART NAME	ZENITH PART No.	NOTES
M2	Tuning cap	22-2427	(17-436MMF) (27-190MMF)
M3	Switch	85-532	Radio-Phono
	Knob	46-1019	Tone
	Knob	S-20307	Volume
	Knob	46-1020	Radio-phono
	Knob	46-1105	Tuning
	Cabinet	14-1468	Top section
	Cabinet	14-1469	Bottom section

CHASSIS—BOTTOM VIEW



PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

ZENITH
MODEL L566 (Ch. 5L08)



THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	10KΩ	.8Ω	25Ω	36Ω	† 1KΩ	† 1KΩ	2. 7Meg
V 2	12BA6	10 Meg	0Ω	0Ω	12Ω	† 1KΩ	† 1KΩ	120Ω
V 3	12AT6	4. 7Meg	0Ω	25Ω	12Ω	500KΩ	500KΩ	† 470KΩ
V 4	50C5	150Ω	470KΩ	88Ω	36Ω	470KΩ	† 1KΩ	† 250Ω
V 5	35W4	120Ω	† 28Ω	88Ω	123Ω	123Ω	115Ω	70KΩ

MEASUREMENTS MADE IN RADIO POSITION
† MEASURED FROM PIN 7 OF V5

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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